GARMIN

G1000 / GFC 700
System Maintenance Manual

Model C90A/C90GT King Air

Contains Instructions
For Continued Airworthiness
For STC #SA01456WI-D

190-00682-01 February 2010 Revision D

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WARNING

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CAUTION

The GDU lens is coated with a special anti-reflective coating that is very sensitive to skin oils, waxes and abrasive cleaners. CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING. It is very important to clean the lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

IMPORTANT

All G1000 screen shots used in this document are current at the time of publication. Screen shots are intended to provide visual reference only. All information depicted in screen shots, including software file names, versions and part numbers, is subject to change and may not be up to date.

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1 INTRODUCTION

1.1 Content, Scope, Purpose

This document provides Instructions for Continued Airworthiness (ICA) for the Garmin G1000 integrated avionics and GFC700 Automatic Flight Control System (AFCS) as installed in the C90A/C90GT King Air, under STC #SA01456WI-D. This document satisfies the requirements for continued airworthiness as defined by 14 CFR Part 23.1529 and Appendix G. Information in this document is required to maintain the continued airworthiness of the G1000 and GFC700.

1.1.1 Applicability

This document applies to all Model C90A/C90GT King Air aircraft equipped with the G1000 and optional GFC700 AFCS systems.

Modification of an aircraft by this Supplemental Type Certificate (STC) obligates the aircraft operator to include the maintenance information provided by this document in the operator's Aircraft Maintenance Manual and the operator's Aircraft Scheduled Maintenance Program.

1.1.2 Identifying an STC Configuration

Table 1-1 lists the approved configurations for this STC as defined by the Master Drawing List (MDL), Garmin document 005-00375-30.

Software loads are governed primarily by the G1000 System Software Version number. The following table identifies the System Software Version for this STC.

NOTE

G1000 System Software Version 0636.02 is the recommended software for STC MDL Rev. 5. G1000 System Software Version 0636.01 will remain to support fielded aircraft.

Table 1-1. MDL Configurations Summary

MDL Configuration	Aircraft Model	G1000 System Software Version	Notes
-1	C90A/C90GT King Air	**0636.01**	STC MDL Rev. 4 Approval
-1	C90A/C90GT King Air	**0636.02**	STC MDL Rev. 5 Approval

This STC addresses multiple C90A/C90GT configurations. These configuration variants are added by loading the applicable airframe configuration. Refer to Table 5 of the General Arrangement Drawing, Garmin Part Number 005-00375-22, for C90GT and Blackhawk and/or Raisbeck configuration information.

IMPORTANT!

If the technician is unsure of an aircraft's STC Configuration, perform the following steps:

1. Inspect the aircraft maintenance logs for records of which STC configuration is installed. Inspect aircraft records for signs of other alterations, including field updates and Service Bulletins.
2. Power on the G1000 system by setting the BAT switch to ON, then the EXT PWR switch to ON and finally the AVIONICS MASTER switch to ON.
3. Following MFD power-up, observe upper right section of MFD splash screen for airframe configuration.

OR

After acknowledgement of the splash screen, use the FMS knob on the GCU 475 controller to go to the AUX – SYSTEM STATUS page on the MFD. In the AIRFRAME section (upper right corner,) the display shows the current G1000 airframe configuration and system software version number. The airframe configuration is shown in the AIRFRAME field and the system software version number is shown in the following format: 'System Software Version XXXX.XX'. It correlates to the G1000 software used to load the software to the system:

EXAMPLE:

System Software Version **'0636.02'** = G1000 Software P/N 006-B**0636-02**

The G1000/GFC 700 C90 General Arrangement Drawing, Garmin Document 005-00375-22, defines the approved G1000 software for this STC.

1.2 Organization

The following outline briefly describes the organization of this manual:

Section 2: System Description
Provides a complete description of the type design change associated with installing the G1000 integrated cockpit system in the C90A/C90GT King Air. An overview of the G1000 and GFC 700 system interface is also provided.

Section 3: G1000 Control & Operation
Presents basic control and operation information specifically tailored to maintenance practices. Basic G1000 Configuration Mode operation is also described.

Section 4: Instructions for Continued Airworthiness
Provides maintenance instructions for continued airworthiness of the G1000 and GFC 700 systems.

Section 5: Troubleshooting
Provides troubleshooting information to aid in diagnosing and resolving potential problems with the G1000 and GFC 700 systems.

Section 6: G1000 Equipment Removal & Replacement
Gives instructions for the removal and replacement of G1000 and GFC700 equipment.

Section 7: G1000 Equipment Configuration & Testing
Gives instructions for loading software, configuring, and testing of G1000 equipment.

Section 8: System Return to Service Procedure
Specifies return-to-service procedures to be performed upon completion of maintenance of the G1000 system.

1.3 Definitions/Abbreviations

ADF: Automatic Direction Finder
ADTS: Air Data Test Set
AFCS: Automatic Flight Control System
AFM: Aircraft Flight Manual
AFMS: Aircraft Flight Manual Supplement
AHRS: Attitude Heading Reference System
CDU: Control Display Unit
CFR: Code of Federal Regulations
DME: Distance Measuring Equipment
EAU: Engine/Airframe Unit
GPS: Global Positioning System
HSDB: High-Speed Data Bus (Ethernet)
IAU: Integrated Avionics Unit
ICS: Inter-Com System
ITT: Interstage Turbine Temperature
LRU: Line Replaceable Unit
MFD: Multi-Function Flight Display
OAT: Outside Air Temperature
PFD: Primary Flight Display
STBY: Standby
STBY ATT: Standby Attitude Indicator
STBY ALT: Standby Altimeter
STBY A/S: Standby Airspeed Indicator
STC: Supplemental Type Certificate
WAAS: Wide Area Augmentation System
VHF: Very High Frequency

1.3.1 Units of Measure

Unless otherwise stated, all units of measure are English units.

1.4 Publications

The following documents are required by this maintenance manual to perform maintenance:

Table 1-2. Required Documents

Part Number	Garmin Document
005-00375-30	STC Master Drawing List
005-W0022-00	Wiring Diagram, G1000/GFC 700 King C90
005-00375-22	General Arrangement, G1000/GFC700 AFCS, King Air C90
005-00375-19	GWX 68 Radar Install, King Air C90A
005-00375-21	Antenna Install, King Air C90A
005-00375-28	Main Instrument Panel Installation, King Air C90
005-00375-34	Electrical Equipment Install, Nose Bay, King Air C90A
005-00375-41	Roll Servo Install, King Air C90A
005-00375-42	Yaw Servo Install, King Air C90A
005-00375-43	Pitch Servo Install, King Air C90A
005-00375-44	Pitch Trim Servo Install, King Air C90A
005-00375-53	Magnetometer Install, King Air C90A
005-00375-54	OAT Sensor Install, King Air C90A
005-00375-71	Standby Battery Install, King Air C90A
005-00375-78	Cabin Speaker Amplifier Installation, King Air C90
005-00375-79	Fwd Bulkhead Connector Plate Installation, King Air C90
320-00326-XX	Wire Harness Assembly, G1000/GFC 700
005-00375-55	Wire Harness Routing, Nose, King Air C90
005-00375-56	Wire Harness Routing, Cabin, King Air C90
005-00375-31	Wire Harness Routing, Tail, King Air C90
005-00375-23	Control Wheel Modification,G1000/GFC 700, King Air C90
005-00375-25	Overhead Control Panel Modification, G1000/GFC 700, King Air C90A
005-00375-26	Pedestal Re-Configuration, King Air C90A
005-00375-29	Circuit Breaker Panel Modification, King Air C90A
005-00375-70	Circuit Breaker Panel Modification, King Air C90A
005-00375-83	Glareshield Lighting Modification, King Air C90
	Hawker Beechcraft Document
90-590024-11	King Air C90 Series Wiring Diagram Manual
90-590012-13	King Air Model 90 Series Maintenance Manual
101-590097-13	King Air Series Component Maintenance Manual
	Other Document
523-0772458-00611A	Collins DME-42 Transceiver Repair Manual (If DME is installed)
9016182	Installation Manual and Operating Instructions, 4200 Series Attitude Indicator

The following publications are recommended to be on hand during the performance of maintenance activities.

Table 1-3. Reference Publications

Part Number	Garmin Document
190-00682-02	G1000/GFC 700, King Air C90A/C90GT Airplane Flight Manual Supplement
190-00664-XX	G1000/King Air C90A/C90GT Cockpit Reference Guide
190-00355-04	GDL 69/69A XM Satellite Radio Activation Instructions
190-00907-00	G1000 System Maintenance Manual
190-00303-72	GSA8X/GSM85(A) Installation Manual
	Hawker Beechcraft Document
98-39006	Structural Inspection and Repair Manual

Generic installation manuals for individual Garmin LRUs are also available through the 'Dealers Only' section of the Garmin web site; refer to Section 1.5 for details.

1.5 Distribution

This document is required for maintaining the continued airworthiness of the aircraft. Revisions to this document will be made by Garmin and will be distributed by Garmin per standard documentation revision procedures.

For the latest revision to this document, check Garmin's web site at: www.garmin.com/ and click on 'Dealers Only'.

NOTE

Only Garmin-authorized dealers and service centers are given access to the Dealer portion of the Web Site. If you do not have a Dealer Password, contact Garmin directly to obtain the latest revision of this document.

2 SYSTEM DESCRIPTION

2.1 Equipment Descriptions

2.1.1 GDU 1040A PFD (2) & GDU 1500 MFD

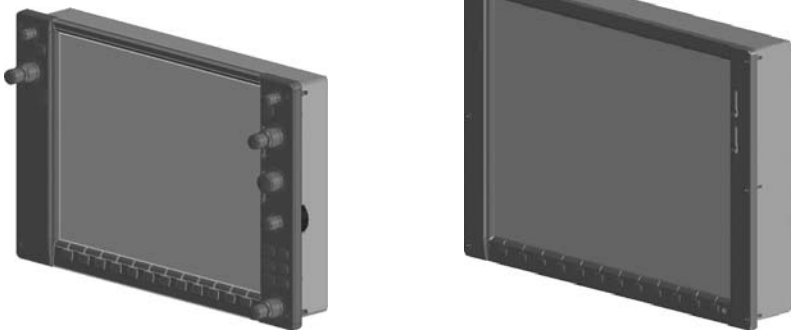
Two Garmin GDU 1040A displays and one GDU 1500 display are installed in the King Air instrument panel. The GDU 1040A units, 10.4 inch LCD displays with 1024x768 resolution, are configured as PFD 1 and PFD 2; the GDU 1500 unit, a 15 inch LCD display with 1024x768 resolution, is configured as a MFD. All displays provide control and display of nearly all functions of the G1000 integrated cockpit system. The PFD displays are located on either side of the MFD, with the stand-by instruments located between the Pilot's PFD (PFD 1) and the MFD. GMA 1347 Audio Panels are located outboard of each PFD. Additionally, a GMC 710 AFCS Controller is located in the upper instrument panel, above the MFD, and a GCU 475 is installed in the pedestal. The GCU 475 provides the control interface for the MFD.

The GDU 1500 communicates with the GDU 1040A units and the GDL 69A through a high-speed data bus (HSDB) Ethernet connection. The GDU 1500 communicated with the GCU 475 via RS-232 digital interface.

The GDU 1040A units communicate with each other and the GIA 63W units through a high-speed data bus (HSDB) Ethernet connection.

Electrical power to PFD 1, MFD, and PFD 2 is provided by the triple-fed bus. The triple-fed bus is powered by the battery and both generator buses. Additionally, a secondary power source is provided to PFD 1 by the center bus, which is fed by both generator buses and the battery. Therefore, the displays power-up immediately with external or aircraft power or battery operation.

All displays are installed in the King Air panel using ¼-turn fasteners. Three CDU cooling fans are also installed behind the panel for PFD and MFD cooling.



2.1.2 GMA 1347D Audio Panel (2)

The Garmin GMA 1347D Audio Panel integrates NAV/COM digital audio, intercom system and marker beacon controls. The C90 installation includes two GMA 1347 panels. The GMA 1347D panels provide control of all cockpit intercom/mic systems as well as NAV/COM/ILS audio. The units also provide display reversion mode control through a large red button. Power to the audio panels is provided by the avionics bus. These units only power up when the avionics master switch is turned on. The GMA 1347D units interface with the existing marker beacon antenna, as well as existing mic and phone jacks and oxygen mask mic.

2.1.3 GMC 710 AFCS Control Unit

The dedicated AFCS controls on the GMC 710 allow crew control interface with the various GFC 700 autopilot / flight director functions. GMC 710 controls are discussed in detail in the G1000/King Air C90A/C90GT Cockpit Reference Guide. The GMC 710 is powered by the triple fed bus.

2.1.4 GCU 475 FMS Control Unit

The GCU 475 functions as the primary control interface to the GDU 1500 MFD. The GCU 475 provides alphanumeric, softkey, and flight planning function keys used to interface with the G1000; the MFD does not possess any knobs or controls other than softkeys. The GCU 475 is powered by the triple-fed bus.

2.1.5 GIA 63W Integrated Avionics Unit (2)

Two Garmin GIA 63W Integrated Avionics Units (IAUs) contains the VHF COM/NAV receivers, WAAS GPS receiver, Flight Director, and system integration microprocessors. The GIAs also serve as a communication interface to all other G1000 LRUs in the system. Each GIA 63W communicates directly with the on-side GDU 1040A display using a HSDB Ethernet connection. Both GIAs are located remotely in the nose equipment bay. Power is provided to both GIAs by the triple-fed bus. The triple-fed bus is powered by the battery and both generator buses. Additionally, a secondary power source is provided to GIA1 by the center bus, which is fed by both generator buses and the battery. Therefore, the units power-up immediately with external or aircraft power or battery operation. Both GIA 63s interface to the following equipment:

- Existing VOR/LOC/Glideslope Antenna System
- Existing VHF COM #1 & #2 Antennas
- GPS/WAAS Antennas
- GMA 1347D, #1 & #2
- GEA 71, #1 & #2
- GDU 1040A, #1 & #2
- GSA 80 (all) and GSA 81
- GRS 77, #1 & #2
- Traffic System (if installed)

The GIA 63W #1 interfaces to the following additional equipment:

- GDC 74B #1
- GTX 33 #1
- DME 42 (if installed)

The GIA 63W #2 interfaces to the following additional equipment:

- GDC 74B #2
- GTX 33 #2
- ADF 60 (if installed)
- Stormscope (if installed)

2.1.6 GEA 71 Engine/Airframe Unit (2)

The Garmin GEA 71 Engine/Airframe Units provide engine/airframe data to the G1000 system. Data received from transducers/sensors is processed and sent to GIA 63Ws (via RS-485 digital interface), and subsequently to the GDU 1500 MFD. Engine parameters can be displayed on PFD 1 and PFD 2. In the event of a PFD failure, all engine instruments can be displayed on the MFD. The GEAs are located behind the instrument panel and is mounted in a vertical orientation. Power is received from the triple-fed bus. The GEA interfaces to the following:

- Oil Pressure Sensor
- Oil Temperature Sensor
- Fuel Flow Sensor
- Turbine Speed Sensor
- Propeller Speed Sensor
- Torque Sensor
- Interstage Turbine Temperature (ITT) Sensor

2.1.7 GTX 33 Mode S Transponder (2)

The GTX 33 Non-Extended Squitter or GTX 33 Extended Squitter (ES) (Optional) transponders communicate with the on-side GIA 63W through RS-232 digital interface. The units are mounted in the nose equipment bay. Power is provided by the No. 1 and No. 2 avionics bus for GTX 33 No. 1 and No. 2 respectively. The GTX 33 units interface with the existing transponder antennas.

NOTE

A model designation of GTX 33 in this manual will imply either the GTX 33 Non-Extend Squitter or GTX 33 Extended Squitter (ES) transponder.

2.1.8 GDC 74B Digital Air Data Computer (2)

The Garmin GDC 74B computers compile information from the pitot/static system and various outside air temperature (OAT) and awareness sensors and provide digital air data computations to the G1000 system. The GDC 74B communicates with the GIA 63W, GDU 1040A, and GRS 77 using ARINC 429 digital interface. The unit is mounted behind the instrument panel. Power is provided to both GDC 74B units by the triple-fed bus. Additionally, a secondary power source is provided to the No. 1 computer by the center bus. The GDC 74B connects to existing pitot/static ports.

2.1.9 OAT Probe (2)

The Garmin GTP 59 OAT Probes provide the GDC 74B with air temperature data. The OAT probes are mounted to the bottom of the King Air fuselage at F.S. 113.5. The probes receive power from the triple-fed bus.

2.1.10 GRS 77 Attitude & Heading Reference System (2)

The Garmin GRS 77 AHRS units provide attitude and heading information to the G1000 system. The units, mounted nose equipment bay, contain advanced tilt sensors, accelerometers, and rate sensors. The unit interfaces with the GDC 74B and GMU44 Magnetometer and utilizes GPS signals from the GIA 63Ws. Actual attitude and heading information is sent using ARINC 429 digital interface to both GDU 1040As and GIA 63Ws. Power is provided to both GRS 77 units by the triple-fed bus. Additionally, a secondary power source is provided to the No. 1 GRS 77 by the center bus. The GRS 77 interfaces with and provides power to the GMU 44 Magnetometer. The GRS 77 supplies attitude and heading information directly to the PFDs, MFD, and GIAs.

2.1.11 GMU 44 Magnetometer (2)

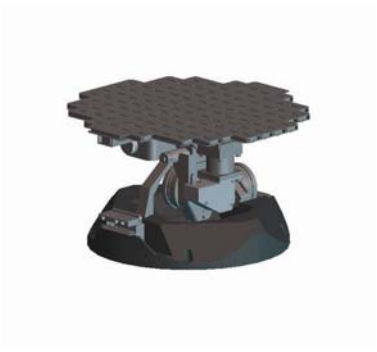
The GMU 44 provides horizontal and vertical magnetic field information to the GRS 77 AHRS. This allows heading to be calculated and provides assistance during AHRS alignment. The GMU 44 units are mounted in the vertical tail. The units receive power directly from the GRS 77 units and communicate with the GRS 77 units via RS-485 digital interface.

2.1.12 GDL 69A Datalink

The GDL 69A provides the interface to the GWX 68 weather radar by acting as a communications hub between the MFD and GWX68 via HSDB. The GDL 69A also provides XM Radio weather and music entertainment through means of a dedicated satellite data link. The GDL 69A is mounted behind the instrument panel. Power to the GDL 69A is received from the avionics No. 3 bus. The GDL 69A sends weather data through the HSDB bus to the MFD, where the data link interface is controlled. Digital audio is sent directly to the GMA 1347D Audio Panel.

2.1.13 GWX 68 Weather Radar

The GWX 68 Airborne Weather Radar provides weather radar data output to the GDU 1500 MFD. The GWX 68 is mounted forward of the forward bulkhead at F.S. 30. Power to the GWX 68 is received from the avionics No. 2 bus. Data received from the GWX 68 is routed through the GDL 69A data link unit to the MFD via high-speed data bus (Ethernet).



2.1.14 GSA 81 Servo, GSA 80 Servo (3) and GSM 85A Servo Mount (4)

The GSA 81 (low-torque) Servo Actuator is an electromechanical unit that will provide automatic control of pitch trim. The Garmin GSA 80 (high-torque) Servo Actuator is an electromechanical unit that will provide pitch, roll and yaw damp and turn coordination. The GSA 80/81 contains a motor-control and monitor circuit board, as well as a solenoid and a brushless DC motor. The GSA 80/81 servo receives serial RS-485 data packets from the GIA 63Ws. The roll servo is located in the lower fuselage at F.S. 185. The pitch, yaw, and pitch trim servos are located in the tail. Power to the servos is received from the avionics No. 2 bus. All servos mount to a Garmin GSM 85A Servo Mount. The GSM 85A is responsible for transferring the output torque of the GSA 80 /81 servo actuators to the mechanical flight control surface linkage

2.1.15 Comant CI428-410 / CI428-200 GPS/WAAS Antennas

The Comant CI428-410 GPS/WAAS/XM and CI428-200 GPS/WAAS antennas meet the GPS WAAS Gamma 3 specifications required for G1000. For procedural instructions on accessing the GPS antennas, refer to the King Air Model 90 Series Maintenance Manual listed in Table 1-2.

2.1.16 Thommen 5A58.22.26K.28.1 Airspeed Indicator

Either a Thommen 5A58.22.26K.28.1.ET, 5A58.22.26K.28.1.FE, 5A58.22.26K.28.1.FA or 5A58.22.26K.28.1.FP unit is installed as the standby airspeed indicator. The difference between the part numbers is the location of the Vmca red radial; 80 KT, 85 KT and 90 KT respectively. The General Arrangement drawing, listed in Table 1-2, contains Table 4, which shows the applicability of each part number. The standby airspeed indicator is self illuminated and is connected to the left generator bus. The internal lights are also connected to the emergency standby battery.

2.1.17 Thommen 3A43.22.35F.28.1.FU Altimeter

The Thommen 3A43.22.35F.28.1.FU altimeter with internal vibrator is used as the standby altimeter. The vibrator is powered by the No. 1 triple-fed bus. This unit is self illuminated and its internal lighting is connected to the left generator bus. Both the vibrator and the internal lighting are also connected to the emergency standby battery.

2.1.18 Mid-Continent 4200-10 Attitude Indicator

The Model 4200-10 Electric Attitude Indicator is used as the standby attitude indicator and is connected to the No. 3 triple-fed bus. This unit is self illuminated and its internal lighting is connected to the left generator bus. The unit along with its internal lighting is also connected to the emergency standby battery

2.1.19 L-3 PS-835(C or D Model) Emergency Standby Battery

In the event of loss of all normal electrical power, the battery is designed to provide 24 Vdc (nominal) emergency power source for the following items:

- standby attitude indicator (operation and internal lighting)
- standby altimeter (vibrator and internal lighting)

- standby airspeed indicator (lighting only)

The aircraft power buss provides a trickle charge to the PS-835 under normal conditions. This battery is existing in the rear fuselage of aircraft previously equipped with Collins EFIS and is installed in the nose avionics bay by this STC, on aircraft that were not previously equipped with Collins EFIS.

2.1.20 Engine Signal Conditioning

Changes to the engine signal conditioning components were initiated with STC SA01456WI-D Master Drawing List (MDL) 005-00375-30, Revision 5. The Sandia ST26 Tach Generator Unit (PN 305662-00), Senior Aerospace PC920 Signal Conditioning Unit (PN PC920-6A00PH-2A1) and the Garmin 005-00375-93 Tach-Gen Filter Assembly were replaced by the Vibro-Meter Signal Conditioner Signal Conditioner, PN 85-292-2. Reference the Main Instrument Panel Installation drawing listed in Table 1-2 for the locations of the Signal Conditioner Components.

2.1.20.1 Sandia Aerospace ST26 Tach Generator Adapter Units (2)

The ST26 Tach Generator Adapter Units are used for converting the signal from the propeller speed and turbine speed sensors into a signal that is usable by the GEAs. The output signal from this adapter unit will be represented by a 5 VDC square wave signal at same frequency of input signal. The No. 1 ST26 (left side) unit is connected to the No. 1 Triple-fed bus and the No. 2 ST26 (right side) unit is connected to the No. 2 triple-fed bus.

The Sandia Aerospace ST26 Tach Generator Adapter Unit is applicable only to installations using STC SA01456WI-D Master Drawing List (MDL) 005-00375-30, Revision 4 and previously approved revisions.

2.1.20.2 Senior Aerospace PC920 Signal Conditioning Unit

The PC920 unit was installed per this STC only for aircraft with Senior Aerospace Ketema fuel flow transducer, part number 1/2-2-81-306. The PC920 unit is used for converting the signal from the fuel flow sensor into a variable 0 to 5 VDC signal that is proportional to flow rate. The PC920 unit No. 1 channel is connected to the No. 1 triple-fed bus and the No. 2 channel is connected to the No.2 triple-fed bus. The No. 1 channel (connector P9201) converts the fuel flow signal for the left engine and the No. 2 channel (connector P9202) converts the fuel flow signal for the right engine.

The Senior Aerospace PC920 Signal Conditioner Unit is applicable only to installations using STC SA01456WI-D Master Drawing List (MDL) 005-00375-30, Revision 4 and previously approved revisions.

2.1.20.3 Garmin 005-00375-93 Tach-Gen Filter Assembly (2)

The Tach-Gen Filter Assembly is used to filter out high frequency signal noise and is installed between the Sandia ST26 Signal Conditioner and both the propeller speed and turbine speed sensors. There is one tach-gen filter installed for each engine. The left engine tach-gen filter is installed on the underside of the floor panel located forward of the pilots seat position. The right engine tach-gen filter is installed on the underside of the floor panel located forward of the co-pilots seat position. There are no power requirements for the tach-gen filter assembly.

The Garmin Tach-Gen Filter Assembly, 005-00375-93 is applicable only to installations using STC SA01456WI-D Master Drawing List (MDL) 005-00375-30, Revision 4 and previously approved revisions.

2.1.20.4 Vibro-Meter Signal Conditioner (2)

Each GEA 71 receives signals from its on-side engine turbine speed sensor, propeller speed sensor and fuel flow sensors via a Vibro-Meter Signal Conditioner. This unit converts the signals from the engine sensors to a signal usable by the GEA 71. These units are installed behind the instrument panel. Electrical power to the No. 1 Engine Signal Conditioner is provided from No. 1 Triple-fed bus and to the No. 2 Engine Signal

Conditioner from No. 2 triple-fed bus. Both signal conditioners will power-up immediately with external or aircraft power or battery operation.

The Vibro-Meter Signal Conditioner is applicable only to installations using STC SA01456WI-D Master Drawing List (MDL) 005-00375-30, Revision 5 and subsequent approved revisions or fielded installations modified in accordance with Garmin Document 190-00682-06.

2.2 G1000 Optional Interfaces

Optional equipment includes BF Goodrich WX-500 Stormscope, Traffic System, Rockwell Collins ADF-60A and Rockwell Collins DME-42. Refer to wiring diagram listed in Table 1-2, for specific interface information.

2.3 Electrical Power Distribution

This airplane uses a multi-bus system, as detailed below and in Figures 2-1 and Figure 2-2. In normal operation, all buses are automatically tied into a single-loop system where all sources supply power through individual protective devices. The battery and generator switches on the pilot's left subpanel are used to control power from the ship battery and generators into the airplane electrical system. Switches in the cockpit that receive power from the center and triple-fed buses are identified by a white ring on the panel around the switch.

Left and Right Generator Buses: The left and right generator buses receive power from their respective left and right generators (ref. Figure 2-1). The left and right generator buses also support the No. 2 and No. 3 avionics buses, respectively, via the avionics master switch (ref. Figure 2-2). The No. 2 avionics bus supplies power to the following G1000 equipment: GMA 2, GTX 2,), GWX 68, GSA 81 servos. The No. 3 avionics bus supplies power to the GDL 69. The No. 2 and No. 3 avionics buses also supply power to optional interface equipment.

Center Bus: The center bus is fed by two generator buses and the hot battery bus, which automatically connects those components whenever the bus ties are closed (ref. Figure 2-1). The center bus provides a secondary power source for the following G1000 equipment: PFD 1, GIA 1, GDC 1, and GRS 1.

Triple-fed Bus: The triple-fed is powered from the hot battery bus and both generator buses (ref. Figure 2-1.) The triple-fed bus also supports avionics no.1 bus via the avionics master switch (ref. Figure 2-2). The following G1000 equipment is supported by the triple-fed bus: MFD, PFD 1, PFD 2, GCU 475, GMC 710, GIA 1, GIA 2, GEA 1, GEA 2, GDC 1, GDC 2, OAT, GRS 1, and GRS 2. The No. 1 avionics bus provides power for the following G1000 equipment: GMA 1 and GTX 1. The No. 1 triple-fed bus provides power to the No.1 Sandia Aerospace ST26 tach generator adapter, No 1 channel of the Senior Aerospace PC 920 fuel flow conditioner and Thommen standby altimeter vibrator (under normal conditions.) The No 2 triple-fed bus provides power to the No. 2 Sandia Aerospace ST26 tach generator adapter and the No. 2 channel of the Senior Aerospace PC 920 fuel flow conditioner. The No. 3 triple-fed bus provides power to the Mid-Continent standby attitude indicator (under normal conditions) and provides power for charging the L-3 emergency standby battery.

Emergency Standby Battery Function: The Standby Emergency Battery (STBY BATT) system in the King Air C90 is designed to provide uninterrupted DC power to the Standby Attitude indicator (gyro motor) and the Standby Altimeter (vibrator) from the L-3 PS-835(C or D Model) Emergency Standby Battery. In addition, the STBY BATT system supplies a fixed lighting voltage to the Standby Attitude Indicator, the Standby Altimeter, and the Standby Airspeed Indicator in the event of a total loss of DC power (ref. Figure 2-1.) The STBY BATT system is a redundant power source to the Standby Attitude indicator, Standby Altimeter, and the Standby Airspeed Indicator.

The electrical system is protected from excessively high current flow by the bus tie system. A bus tie sensor and relay is located between each generator bus and the center bus and also between the hot battery bus and the center bus. When the battery switch is on, hot battery bus voltage energizes and closes the relay. Similarly, when a generator or external power is brought on-line, the generator bus tie relays are energized and closed.

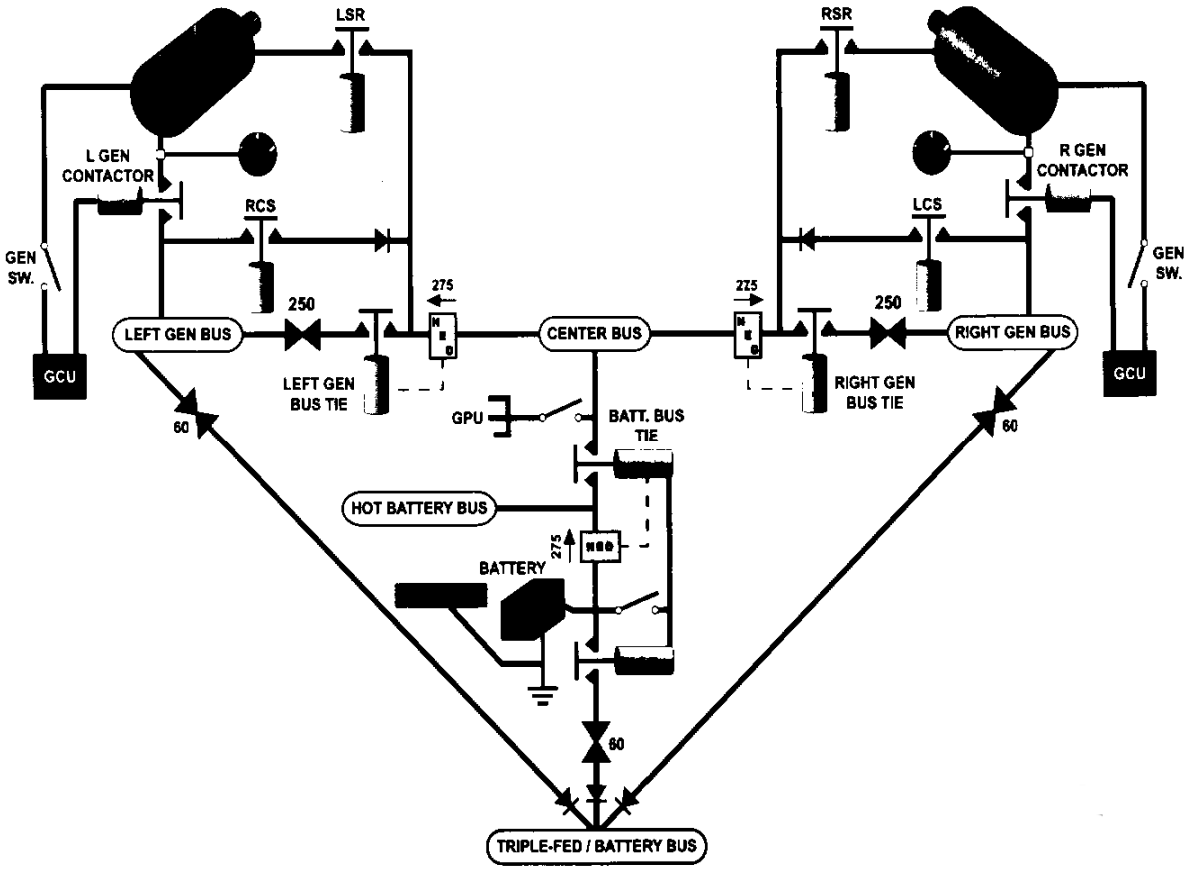


Figure 2-1. C90 Electrical Distribution

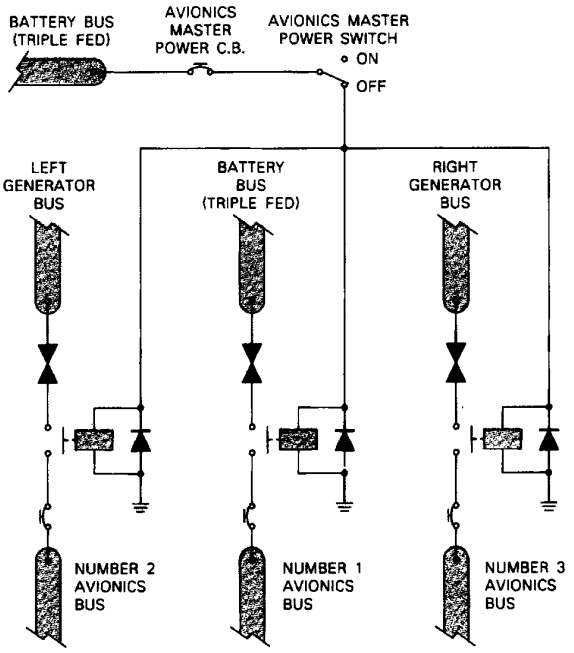


Figure 2-2. Avionics Master Power Schematic

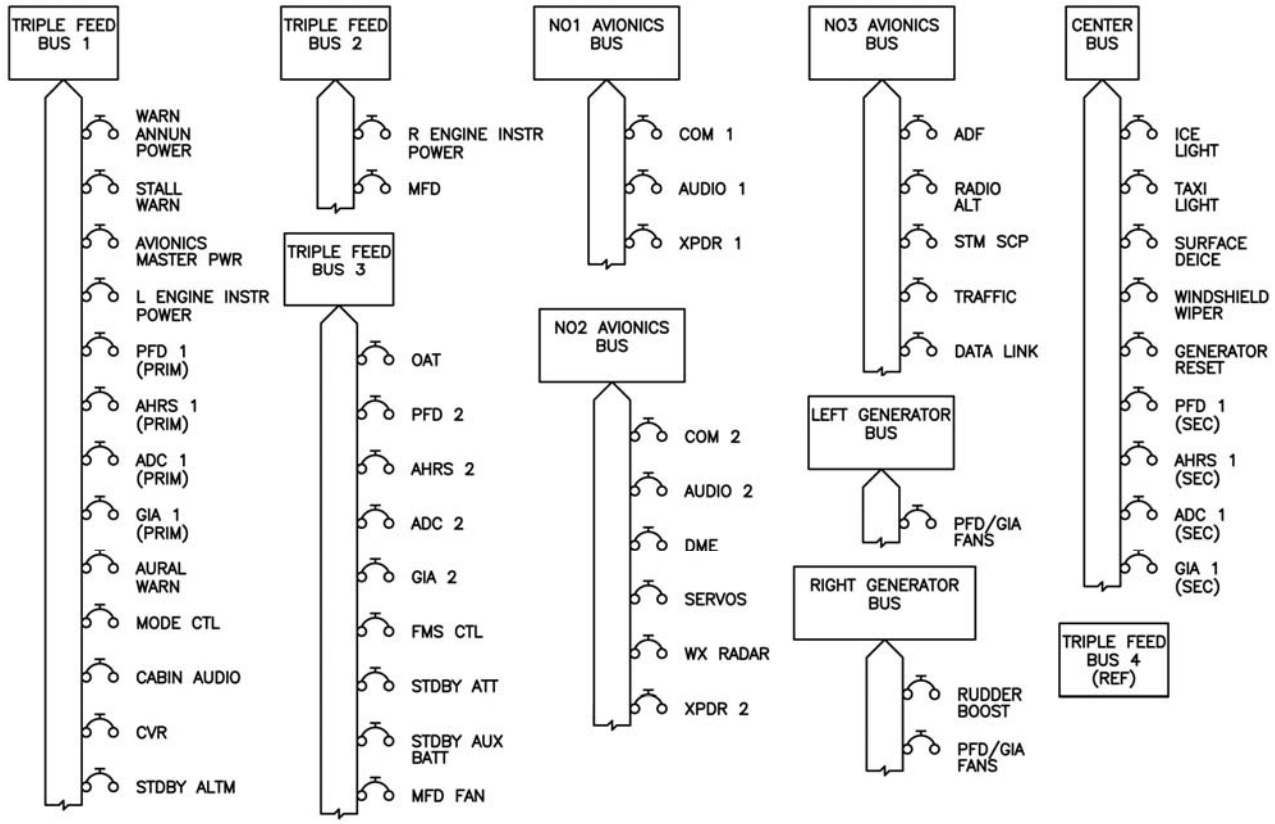


Figure 2-3. G1000 Component Power Sources

2.4 Shield Block Grounds

The connectors on Garmin G1000 LRUs utilize the Shield Block grounding system to provide necessary ground reference to wire shielding and/or transducers. The shield block termination method allows multiple grounds to be terminated directly to a block mounted to the connector backshell assembly. Shielding and grounding requirements for all other LRUs and connectors are shown in the respective install drawings.

2.5 G1000 /GFC700 Block Diagram

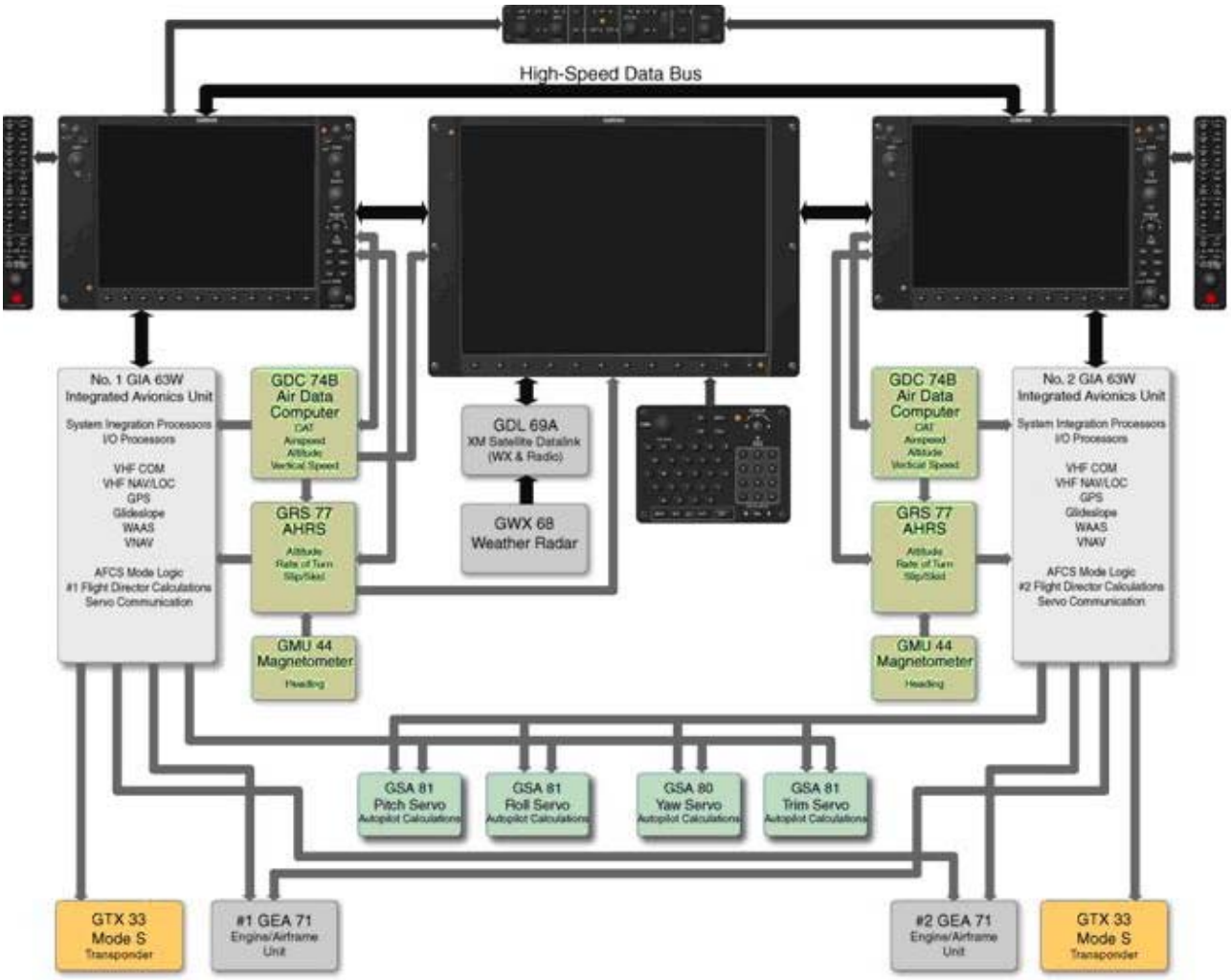


Figure 2-4. G1000/GFC 700 Block Diagram

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3 G1000 Control & Operation

All control and operation of G1000 equipment as normally used in flight occurs through the PFDs, MFD, GMC 710, GCU 475 and GMA 1347 audio panel. Figure 3-1 thru Figure 3-6 identifies various interface buttons for these units.

3.1 GDU 1040A and GDU 1500 Displays

Figure 3-1 and Figure 3-2 provide identification of the GDU 1040A PFD and GDU 1500 MFD controls.

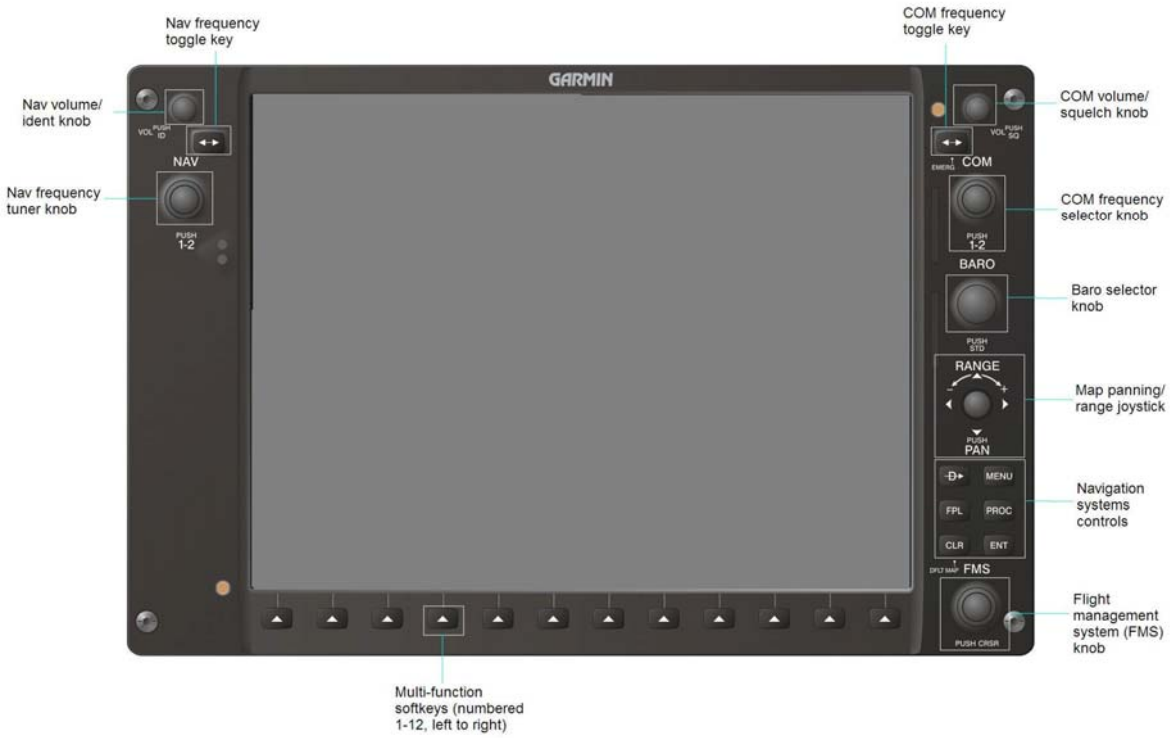


Figure 3-1. GDU 1040A Control Interface

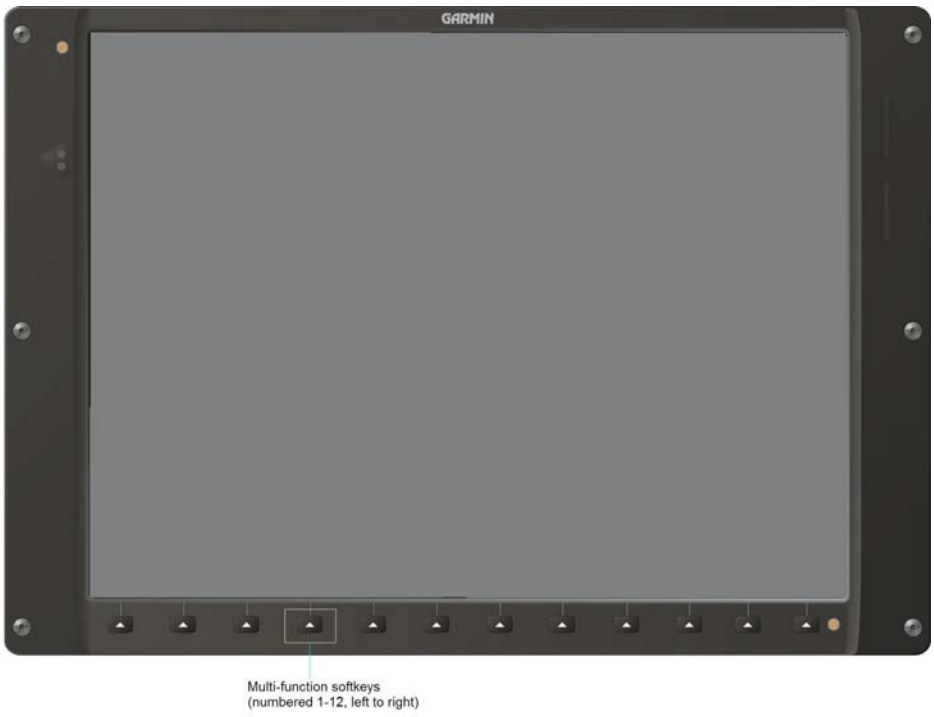


Figure 3-2. GDU 1500 Control Interface

3.1.1 Softkeys

Some pages have commands or selections that are activated by the GDU 1040 softkeys. If a softkey is associated with a command, that command will be displayed directly above the key. A grayed-out softkey shows a command that is unavailable. A softkey that is highlighted shows the current active selection.

Figure 3-3. G1000 Softkeys

3.1.2 FMS Knob

The FMS knob is the primary control for the G1000 system. Operation is similar to the Garmin 400/500 Series units.

- To cycle through different configuration screens:

  To change page groups: Rotate the large FMS knob.

  To change pages in a group: Rotate the small FMS knob.
- To activate the cursor for a page, press the small FMS knob directly in, as one would push a regular button.
- To cycle the cursor through different data fields, rotate the large FMS knob.
- To change the contents of a highlighted data field, rotate the small FMS knob. This action either brings up an options menu for the particular field, or in some cases allows the operator to enter data for the field.
- To confirm a selection, press the ENT key.
- To cancel a selection, press the small FMS knob in again, deactivating the cursor. The CLR key may also be used to cancel a selection or deactivate the cursor.

3.2 GCU 475 - MFD Controller

The MFD controls are located on the GCU 475 as show in Figure 3-4.

Figure 3-4. MFD Controls (GCU 475 shown)

3.3 GMC 710 - AFCS Controls

The dedicated AFCS controls located on the GMC 710 are discussed in detail in the G1000 CRG. The following figure is provided for reference:

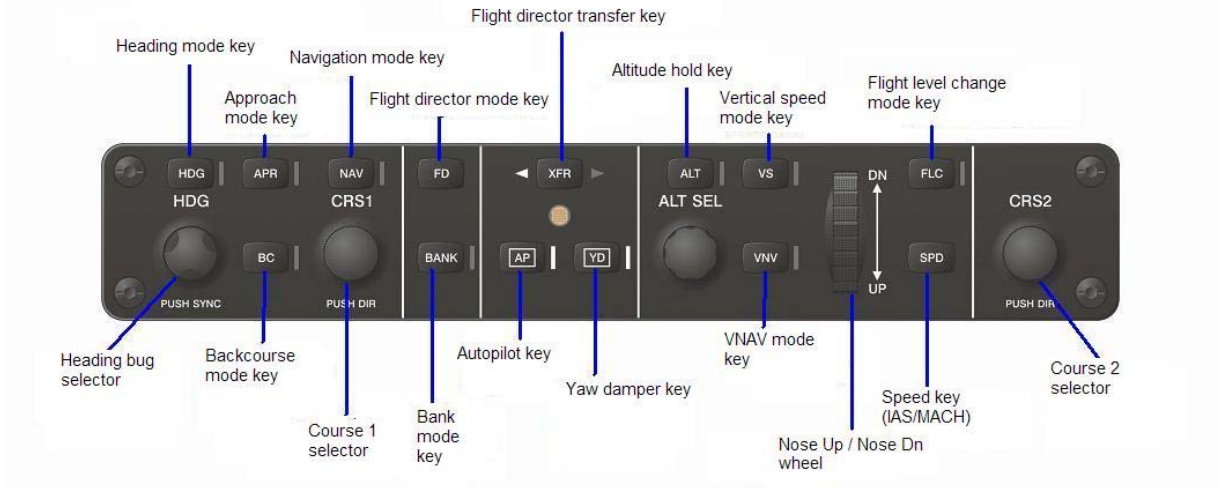


Figure 3-5. AFCS Controls (GMC 710 shown)

3.4 GMA 1347D Audio Panel

Figure 3-6 provides the audio panel controls for GMA 1347D PN 011-01257-00. The GMA 1347D PN 011-01257-00 is applicable only to installations using STC SA01456WI-D Master Drawing List (MDL) 005-00375-30, Revision 4 and previously approved revisions.

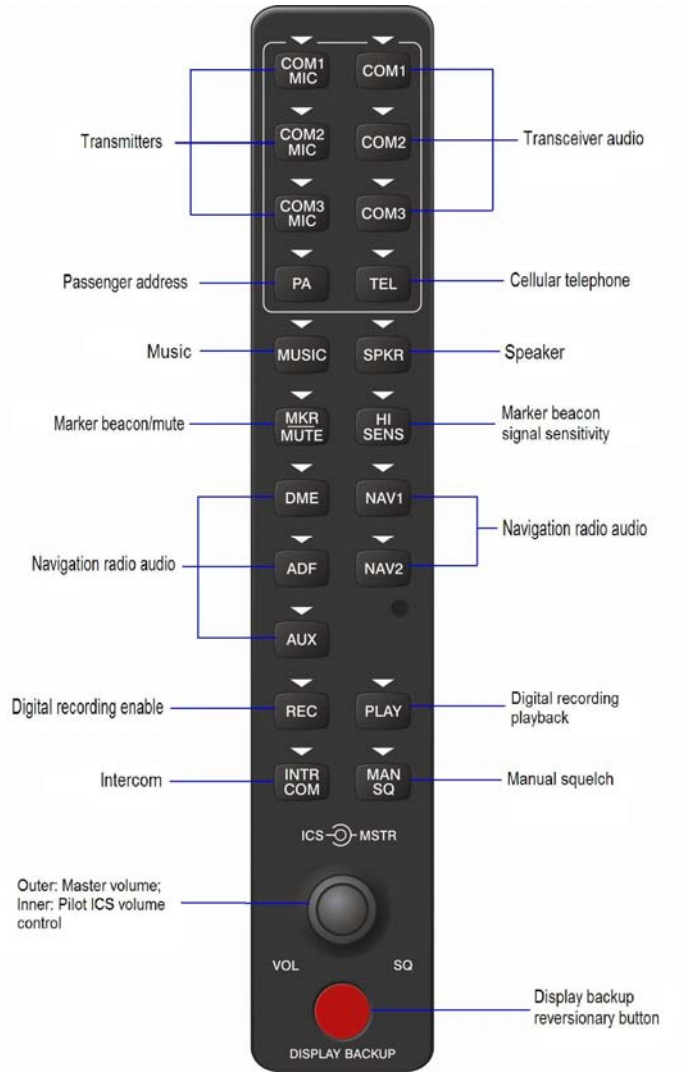


Figure 3-6. GMA 1347D PN 011-01257-00 Controls

Figure 3-7. GMA 1347D PN 011-01257-20 Controls provides the audio panel controls for GMA 1347D PN 011-01257-20. The GMA 1347D PN 011-01257-20 with the Cabin Intercom button is applicable only to installations using STC SA01456WI-D Master Drawing List (MDL) 005-00375-30, Revision 5 and subsequent approved revisions or fielded installations modified in accordance with Garmin Document 190-00682-06.

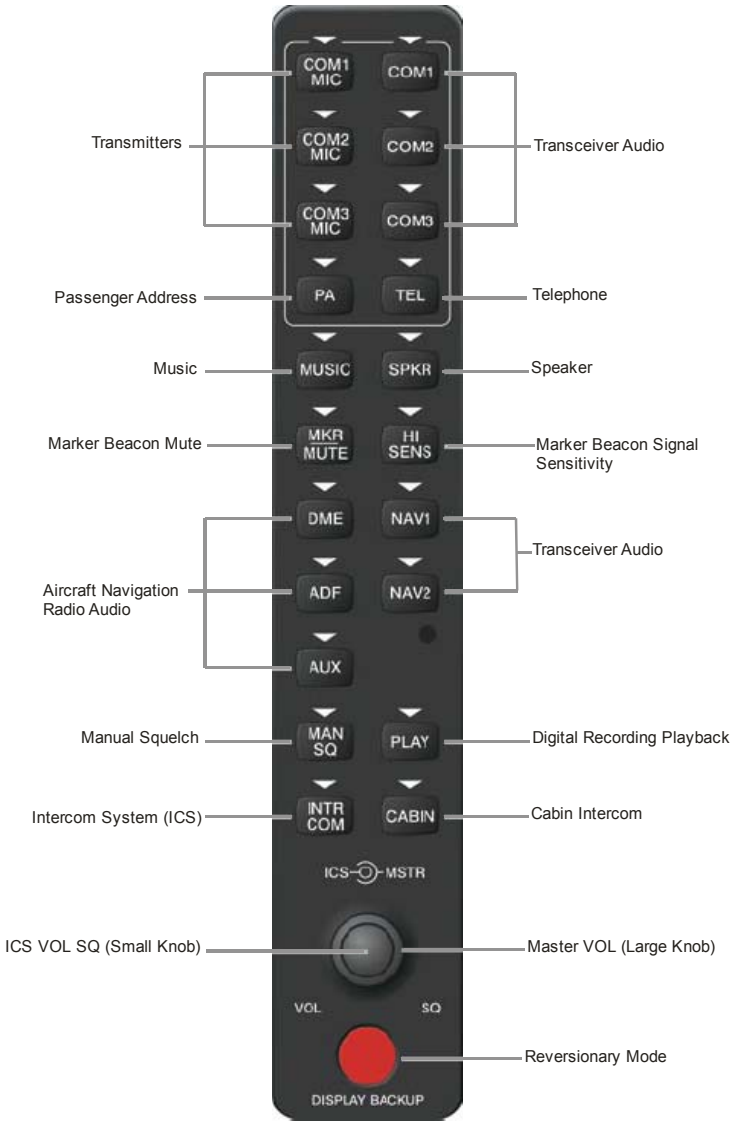


Figure 3-7. GMA 1347D PN 011-01257-20 Controls

3.5 G1000 Normal Mode

To start the G1000 system in Normal Mode:

1. With a ground power unit connected to the external power receptacle, set the BAT and EXT PWR switches to 'ON'. The following G1000 equipment is powered:
    - PFDs displays & MFD display
    - GRS 77 AHRS Units
    - GDC 74B Air Data Computers
    - GIA 63W Integrated Avionics Units
    - GEA 71 Engine/Airframe Units
    - GCU 475 FMS Control Unit
    - GMC 710 Autopilot Control Unit
2. Set the AVIONICS MASTER switch to 'ON'. The following G1000 equipment is powered:
    - GTX 33 Mode S Transponders
    - GMA 1347D Digital Audio Panels
    - GDL 69A Datalink Unit
    - GSA Servos
    - GWX 68 Weather Radar Unit

The G1000 system is now powered in the normal mode. In the normal operating mode, data fields that are invalid have large red X's through them. A valid field does not display a red X. Allow the displays to initialize for approximately one minute. The GDC 74Bs requires a longer initialization period than do the other LRUs. During normal operation, this causes the airspeed, altitude, vertical speed, and OAT fields to be invalid during the first ~40-60 seconds of PFD power-up. The PFDs and MFD will function as specified in the G1000/C90A/C90GT Cockpit Reference Guide, when the system has been correctly installed and configured.

Figure 3-8. Normal Mode

3.6 Reversionary Mode

Reversionary mode allows for display of information related to safe flight in the event of a display communication or hardware failure. On this 3-display system, only a manual reversionary mode is possible. Manual reversionary mode allows the operator to force the pilot or copilot's PFD into reversionary mode by pressing the large red button labeled 'DISPLAY BACKUP' on the respective GMA 1347 audio panel.

NOTE

When the 'DISPLAY BACKUP' button is pushed to exit reversionary mode, there is a 5-second debounce (or the GDU waits for 5 consecutive seconds) and then returns to normal mode if no other input is received. If the 'DISPLAY BACKUP' button is pushed again during this 5-second interval, the timer will repeat the count.

Figure 3-9. Manual Reversion with MFD failure

Figure 3-10. Manual Reversion with pilot PFD failure

3.7 Configuration Mode Overview

The Configuration Mode exists to provide the avionics technician with a means of configuring, checking, and calibrating various G1000 sub-systems. Troubleshooting and diagnostics information can also be viewed in this mode.

To start the system in Configuration Mode:

1. Press and hold the ENT key on the co-pilot's PFD while applying power using the PFD 2 circuit breaker.
2. Release the ENT key after 'INITIALIZING SYSTEM' appears in the upper left corner of the PFD.
3. Press the ENT key or the YES softkey to update system files if prompted.
4. Repeat steps 1 through 3 on the MFD using the MFD circuit breaker to apply power and using the far right soft key on the MFD or the ENT key on the GCU 475 FMS controller where called out in Steps 1 through 3. (Note that the ENT key for the MFD is located on the GCU 475 FMS controller and will not function prior to software load.)
5. Repeat steps 1 through 3 on the pilot's PFD using the PFD 1 (PRI) and PFD 1 (SEC) circuit breakers to apply power.

CAUTION:

The Configuration Mode contains certain pages and settings that are critical to aircraft operation and safety. These pages are protected and cannot be modified, unless the technician is properly authorized and equipped. However, most protected pages are viewable to allow system awareness for troubleshooting.

NOTE

For a complete description and breakdown of each Configuration Mode page, refer to the G1000 System Maintenance Manual listed in Table 1-2.

3.7.1 SET>ACTV Configuration

Throughout the configuration mode pages, there are SET and ACTIVE columns for input/output settings and other parameters.

SET: Refers to a setting or group of settings that reside in PFD Internal Memory and/or the Master Configuration Module.

ACTIVE: Refers to an 'active' setting or parameter currently being used by the LRU. LRUs store the 'active' settings within internal memory.

Data can be manually copied from one column to the other (and consequently from PFD memory to the LRU memory and vice-versa) by using the following two softkeys, when available:

- **SET>ACTV** (read 'Set to Active') softkey: Allows the installer to send the information in the SET column (data stored in the master config module) to the ACTV column (data used by LRU).
- **ACTV>SET** (read 'Active to Set') softkey: Causes the LRUs current settings to be copied to the master configuration module as SET items.

CAUTION:

The ACTV>SET softkey must be used with caution! If an improperly configured unit is installed, this softkey causes the wrong configuration to replace the correct aircraft configuration.

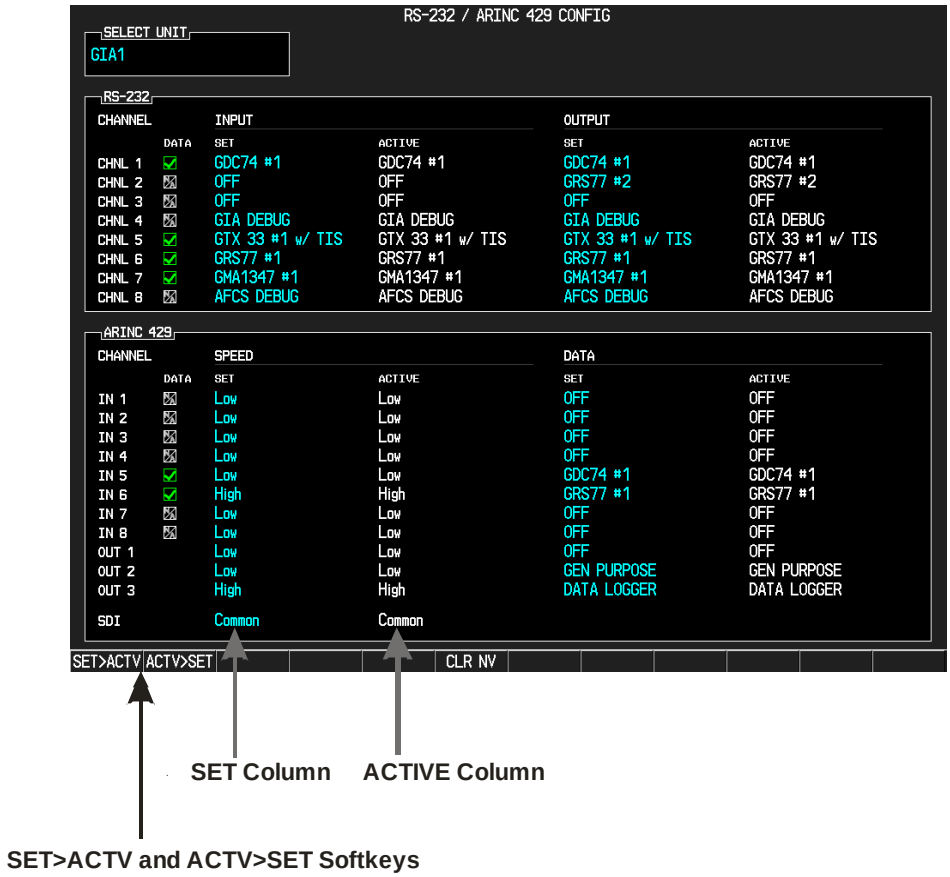

RS-232 / ARINC 429 CONFIG
SELECT UNIT
GIA1
RS-232
CHANNEL
DATA
INPUT
SET
ACTIVE
OUTPUT
SET
ACTIVE
CHNL 1 GDC74 #1 GDC74 #1 GDC74 #1 GDC74 #1
CHNL 2 OFF OFF GRS77 #2 GRS77 #2
CHNL 3 OFF OFF OFF OFF
CHNL 4 GIA DEBUG GIA DEBUG GIA DEBUG GIA DEBUG
CHNL 5 GTX 33 #1 w/ TIS GTX 33 #1 w/ TIS GTX 33 #1 w/ TIS GTX 33 #1 w/ TIS
CHNL 6 GRS77 #1 GRS77 #1 GRS77 #1 GRS77 #1
CHNL 7 GMA1347 #1 GMA1347 #1 GMA1347 #1 GMA1347 #1
CHNL 8 AFCS DEBUG AFCS DEBUG AFCS DEBUG AFCS DEBUG
ARINC 429
CHANNEL
DATA
SPEED
SET
ACTIVE
DATA
SET
ACTIVE
IN 1 Low Low OFF OFF
IN 2 Low Low OFF OFF
IN 3 Low Low OFF OFF
IN 4 Low Low OFF OFF
IN 5 Low Low GDC74 #1 GDC74 #1
IN 6 High High GRS77 #1 GRS77 #1
IN 7 Low Low OFF OFF
IN 8 Low Low OFF OFF
OUT 1 Low Low OFF OFF
OUT 2 Low Low GEN PURPOSE GEN PURPOSE
OUT 3 High High DATA LOGGER DATA LOGGER
SDI Common Common
SET>ACTV
ACTV>SET
CLR NV
SET Column
ACTIVE Column
SET>ACTV and ACTV>SET Softkeys

Figure 3-11. SET and ACTV Softkeys and Columns

When troubleshooting the system, technicians can look for inequalities between SET and ACTIVE columns. Certain problems can be resolved simply by pressing the SET>ACTV softkey, which reloads settings to the specific LRU from the PFD. (Note that this can also be accomplished by reloading the configuration files for the LRU, using the software loader card. Section 7 describes this process for each LRU).

A blank active column, as shown in Figure 3-12, represents loss of communication between the display and the particular unit. See Section 5 for more details on troubleshooting.

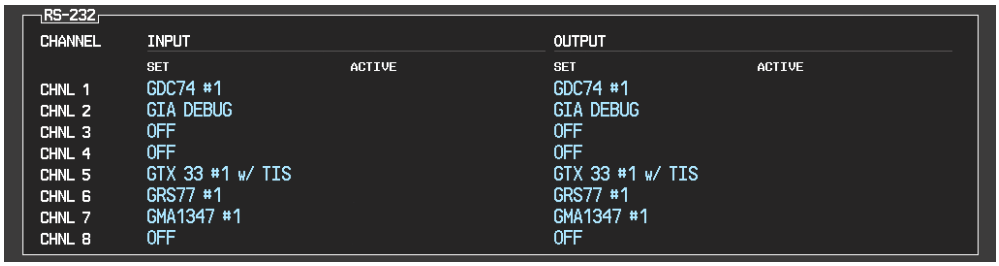


Figure 3-12. Loss of Communication

3.7.2 Configuration Prompts

When configuration settings are changed, the technician receives on-screen prompts and/or confirmations such as those shown in Figure 3-13. Section 7 shows other prompts encountered during the configuration process.

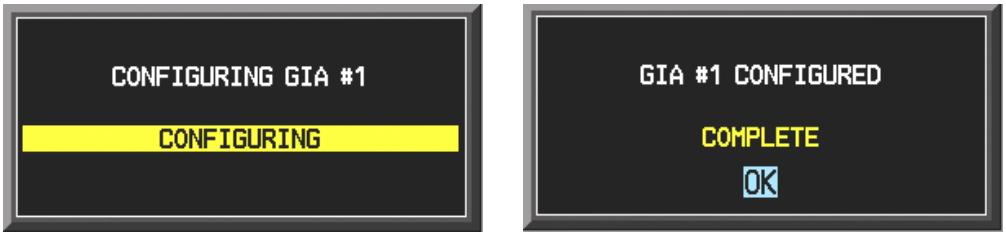


Figure 3-13. Configuration Status

3.7.3 Data Transmission Indicators

Several configuration screens utilize an indicator light system to show discrete (ON/OFF) data and/or hardware component status. A difference in the presentation of the data indicator exists between the two approved versions of C90A G1000 system software. Table 3-1 presents the data indicator differences between the two versions of software.

G1000 System Software Data Indicator Symbol Differences			
006-B0636-01, v 0636.01		**006-B0636-02, v 0636.02**	
Indicator	Meaning	Indicator	Meaning
	Valid		Valid
	Invalid/Fail		Invalid/Fail
	Unknown		Unknown
-	-		OFF
-	-	T	TRUE
-	-	F	FALSE
-	-	H	HIGH
-	-	L	LOW

Table 3-1. Data Indicator Symbols

This manual will depict the data indicator symbols used by the C90A G1000 System Software PN 006-B0636-02, Version 0636.02. The following applies to all such status indicators:

- Green Checkmark: Expected data is successfully received and is ON or VALID. A green check could also indicate that the parameter/component is working correctly.
- Red X: Expected data is not received. A red X could also indicate that a parameter/component is INVALID or FAIL.
- Amber question mark (?): Data is unkown.
- White N/A: Expected data is OFF, or no data is expected.

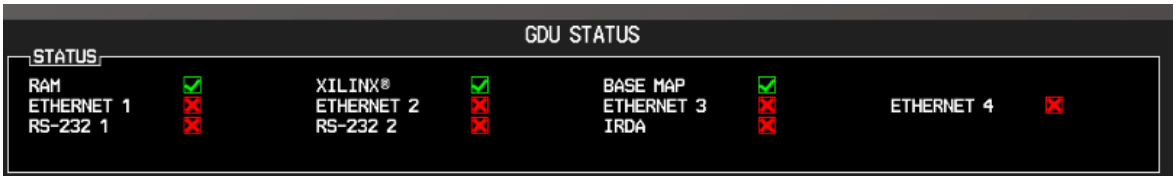


Figure 3-14. Data Transmission Indicators

3.7.4 Configuration Mode Navigation

Using the FMS knob as described in Section 3.1.2, a user can navigate through different pages and page groups in the Configuration Mode. For complete description and breakdown of each page, refer to the G1000 System Maintenance Manual listed in Table 1-2.

System Page Group

1. System Status
2. Time Configuration
3. Lighting Configuration
4. System Audio
5. System Upload
6. Diagnostics Terminal
7. OEM Diagnostics
8 System Configuration
9. System Data Path Configuration
10. System Setup
11. Manifest Configuration
12. Maintenance Log

GDU Page Group

1. Serial Configuration
2. CDU Status Page
3. Key Test
4. Diagnostics
5. Ethernet Test
6. Alert Configuration
7. Airframe Configuration
8. TAWS Configuration

GIA Page Group

1. Serial Configuration
2. GIA / RS-485 Configuration
3. GIA I/O Configuration
4. GIA Configuration
5. GIA Status Page
6. GIA CAN Configuration

GEA Page Group

1. Engine Configuration
2. GEA Status Page
3. GEA Configuration

GTX Page Group

1. Serial Configuration
2. Transponder Configuration

GRS Page Group

1. Inputs Configuration
2. GRS / GMU Calibration

ADC Page Group

1. ADC Configuration
2. GDC Configuration

GFC Page Group

1. GFC Configuration
2. GFC Status

GMA Page Group

1. GMA Configuration

GDL Page Group

1. GDL 69

RMT Page Group

1. Remote Controller Status

GWX Page Group

1. GWX Configuration

CAL Page Group

1. Fuel Tank Calibration
2. Flaps & Trim Calibration
3. HSCM Calibration

3.8 G1000 / GFC 700 Software Information

NOTE

The following sections provide a detailed description of loading all G1000 software and configuration files, which may be excessive for individual LRU removal and replacement. If removing and replacing individual LRUs, refer to Section 6 of this manual for the necessary steps.

3.8.1 G1000 Software Image

All software and configuration files were certified by Garmin and are considered part of FAA-approved Type Design data. Approved software and hardware definitions for each STC Configuration is defined on the appropriate General Arrangement drawing listed in Table 1-2.

G1000 software and configuration files are controlled via the approved software image part number listed on the General Arrangement drawing listed in Table 1-2. This software image is loaded into the G1000 using a software loader card. The installer shall create this software loader card by downloading the approved software image in accordance with section 3.8.2.

NOTE

Only SanDisk and Cactus brand SD cards are recommended for use with the G1000 system.

IMPORTANT!

To satisfy the G1000/GFC700 STC requirements for the C90A/C90GT, it is critical that the technician use the correct software loader card part number when servicing the G1000 system.

Approved loader card part numbers are defined on the appropriate General Arrangement drawing (see Table 1-2).

CAUTION:

Be cautious when using software loader cards during maintenance. The G1000 system immediately initializes the card upon power-up. On-screen prompts must be given careful attention in order to avoid potential loss of data. Always read through procedures given in Sections 5, 6, and 7, *before* attempting to use the software loader cards.

3.8.2 Loader Card Creation

The software image is an executable self-extracting file which builds the correct file structure onto an SD card for use loading software to the G1000 and GFC700. To create a software loader card, follow the procedures outlined below.

NOTE

In order to create a C90A/C90GT loader card, the individual/facility completing these procedures, must be an authorized King Air C90A/C90GT service center to gain access to the necessary data via the Garmin website.

1. Go to www.garmin.com and click on the 'Dealer Only' link in the lower left hand portion of the home page. Enter username and password.

2. Click the Agree button on the confidentiality agreement page.

3. Select the Field-Loadable Software Updates link.

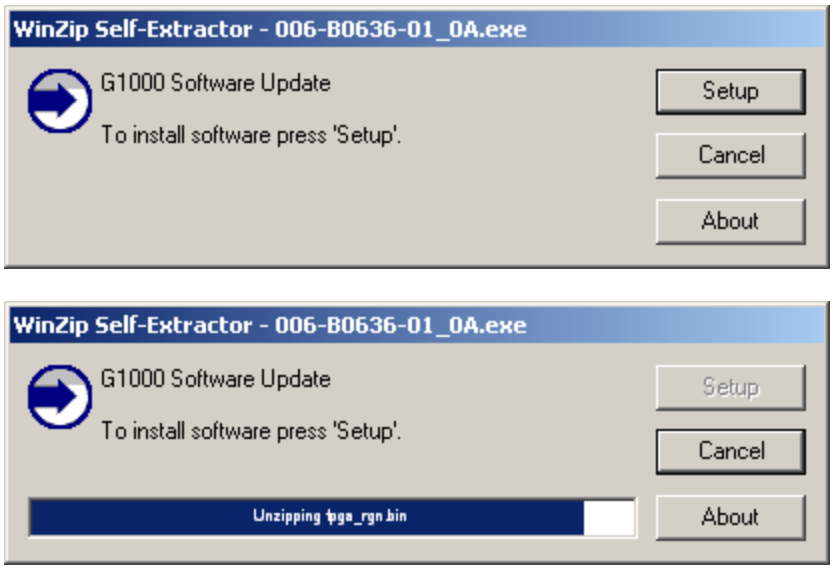
4. Select the King Air C90A/C90GT hyperlink.

5. A screen similar to the one shown below will appear. Select the appropriate software card part number based upon the information provided in Garmin GA Drawing 005-00375-22. The numbers shown below are for example only and are indicative of what will be on the dealer site.

G1000 System Software Version	Service Bulletin*	Software Image Part Number
0636.02	0909.pdf	006-B0636-02

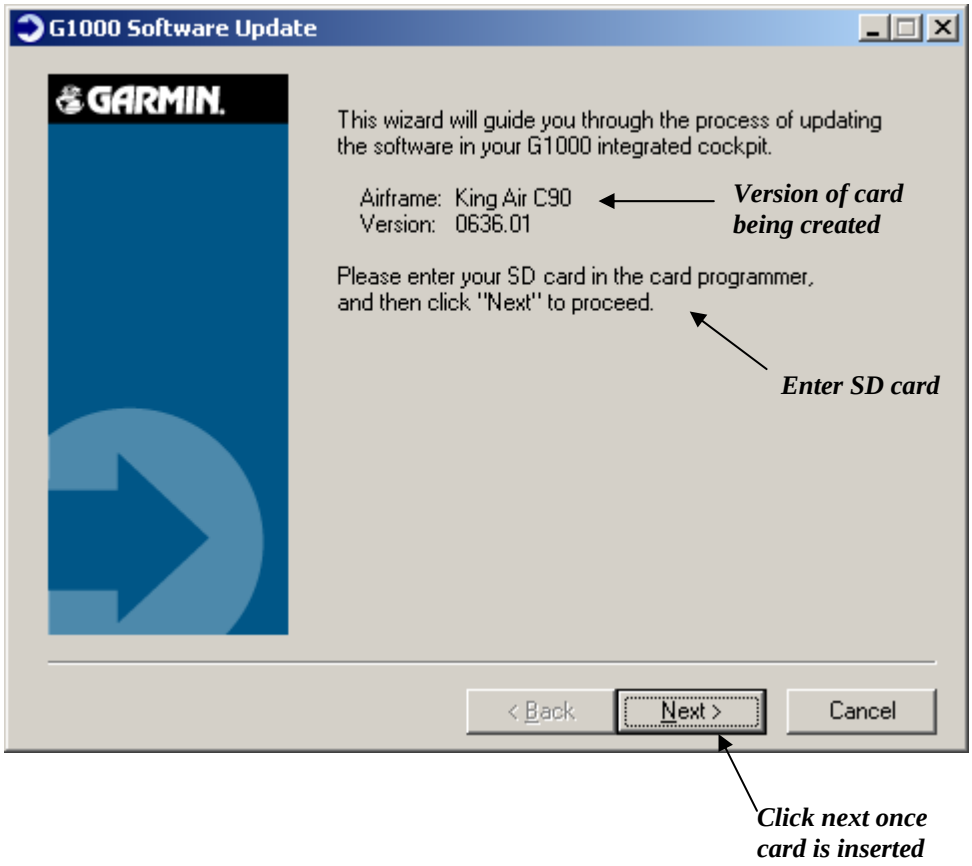
6. Select the appropriate hyperlink and save the file to the local hard drive.

7. Double-click the .exe file that was downloaded. The following window will pop-up on the screen. Ensure that there is an empty SD card in the card reader, and then click Setup.

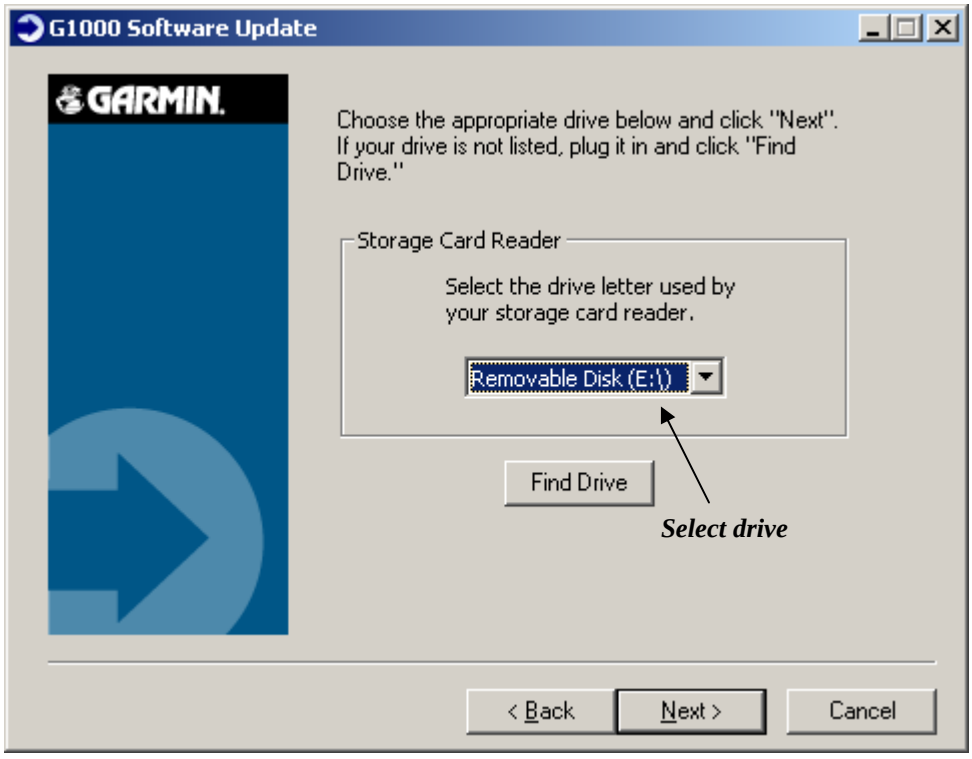


NOTE

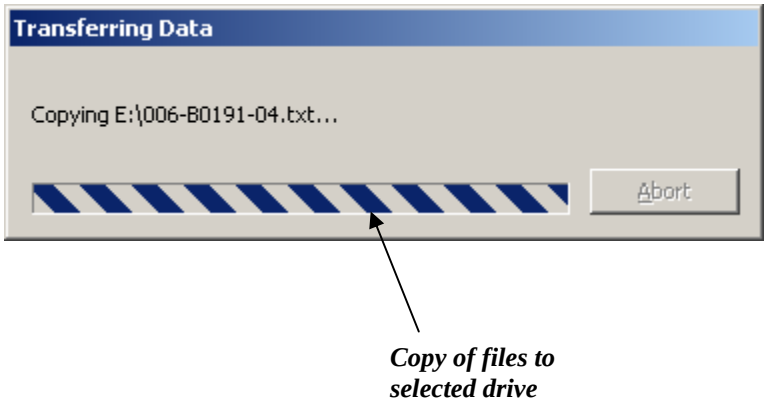
When the extraction begins, the program automatically deletes all current files on the SD card and copies the selected files to it, regardless of the file format on the SD card. Ensure files are not necessary, or card is empty before proceeding.


G1000 Software Update
GARMIN
This wizard will guide you through the process of updating the software in your G1000 integrated cockpit.
Airframe: King Air C90
Version: 0636.01
Version of card being created
Please enter your SD card in the card programmer, and then click "Next" to proceed.
Enter SD card
< Back
Next >
Cancel
Click next once card is inserted

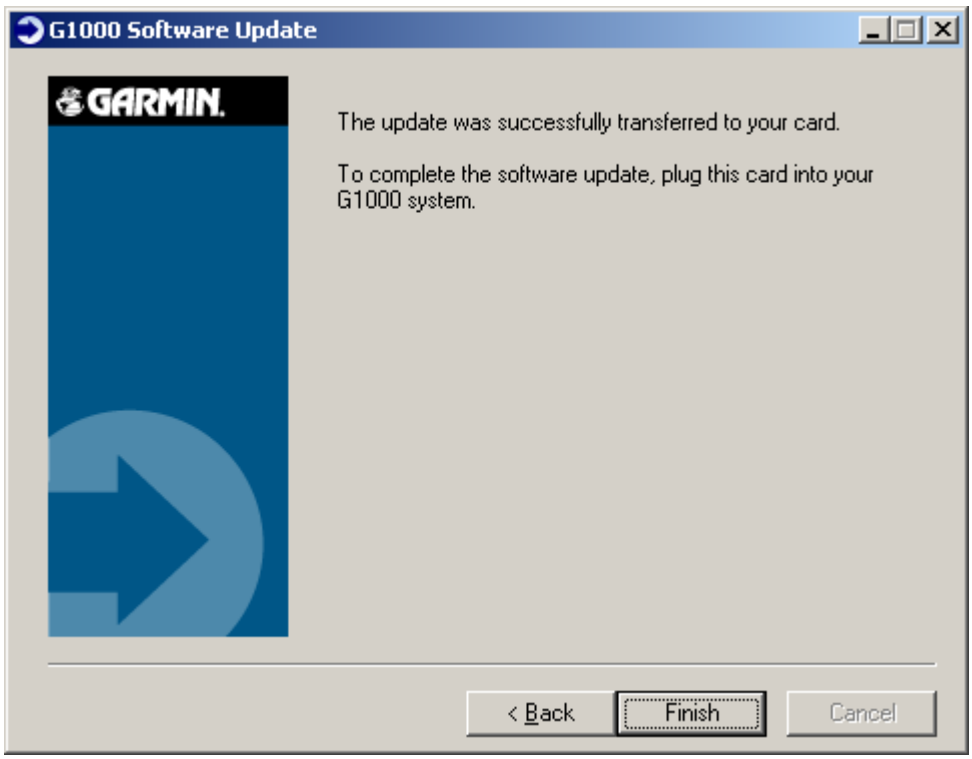
8. Ensure the card and correct drive letter is used, and click next.


G1000 Software Update
GARMIN
Choose the appropriate drive below and click "Next". If your drive is not listed, plug it in and click "Find Drive."
Storage Card Reader
Select the drive letter used by your storage card reader.
Removable Disk (E:\)
Find Drive
Select drive
< Back
Next >
Cancel

9. A window will pop-up onto the screen to indicate file progress.



10. Once successfully completed, the following message/window will pop-up. Click Finish to finalize SD card.


G1000 Software Update
GARMIN
The update was successfully transferred to your card.
To complete the software update, plug this card into your G1000 system.
< Back
Finish
Cancel

3.8.3 Software Files

Software files are defined by part number and version number on the General Arrangement drawing. See Table 1-2 for the correct General Arrangement drawing part numbers. Each G1000 / GFC 700 LRU reports the software version it currently contains to the user in two places.

- Normal System Mode: The AUX – SYSTEM STATUS page lists each LRU and the reported software version.
- Configuration Mode: The SYSTEM STATUS page (SYSTEM page group) reports more detailed LRU information, including software version, part number, and LRU status.

Software files are loaded to LRUs from the SYSTEM UPLOAD page in configuration mode. See Section 3.9.2.

3.8.4 Configuration File Descriptions

Configuration Files are divided into groups, and are only displayed at the System Upload page during the software/configuration loading process. There are four categories of configuration files:

C90

C90-Options

C90-Configurations

C90-Weight and Airspeed

Configuration files contain preset selections for input/output channels, aircraft-specific settings, and LRU-specific settings. The following list describes each of the configuration files:

AIRFRAME	This file contains data such as airspeed parameters, engine/airframe sensor limitations, fuel tank parameters and alerting system settings that tailor a G1000 PFD or MFD to the C90A/C90GT.
AIRFRAME ALERTS	C90A/C90GT-specifc alerts are set when this file is loaded.
SYSTEM	This file configures the G1000 high-speed data bus (HSDB) to expect two PFDs, MFD, two GIAs, and a GDL69.
MANIFEST	This file loads a manifest checklist of all software part numbers and versions associated with an approved system configuration. The G1000 performs a software check between each LRU's reported version and the version contained on the manifest. If an inequality is detected for an LRU, this LRU is then excluded from the G1000 and a manifest alert is triggered to the operator.
MFD1	This file configures MFD serial/discrete communication and alert system settings.
PFD 1/PFD 2	These files configure PFD 1/PFD 2 serial/discrete communication and alert system settings.
GCU	This file configures GCU 475 serial/discrete communication settings.
GMC	This file configures GMC 710 serial/discrete communication settings.
GIA1/GIA2	These files configure GIA1/GIA2 serial/discrete communication settings.
GMA_PIL/ GMA_COPIL	This file configures GMA 1347 audio and serial communication settings for both audio panels.
GTX1/GTX2	These files configure GTX 1/GTX 2 transponder and serial communications settings.
GEA1/GEA2	These files configure GEA 1/GEA 2 engine/airframe parameters.
GDC_PIL/ GDC_COPIL	This file configures GDC 74B air data values for the C90A/C90GT.
GDL_69	This file configures gains and cable loss for the C90A/C90GT installation.
GWX	This file configures parameters as appropriate for the C90A/C90GT radar installation.
AUDIO	This file configures audio alerts for the C90A/C90GT.

3.8.4.1 Airframe and Optional Configurations

Optional equipment configurations are available with the C90A/C90GT. These files are loaded after the factory default configuration is established. Each option modifies one or more of the above configuration files, depending on what setting changes are required to activate the optional equipment. It should be noted that any required supporting hardware for the option must be installed before the option can function.

The following default configuration appears at the System Upload page within the FILE menu, when the "C90" choice is selected from the AIRFRAME menu.

King Air C90 – Baseline

The following optional configurations appear at the System Upload page within the FILE menu, when the "C90-Configurations" choice is selected from the AIRFRAME menu. These options are associated with various Blackhawk/Raisbeck or C90GT configurations. If reloading configuration, refer to Table 5 of the General Arrangement Drawing, listed in Table 1-2, to identify the appropriate configuration for your aircraft. If the technician needs to determine the configuration of an existing installation, refer to Section 1.1.2.

King Air C90A – Config 1
King Air C90A – Config 2
King Air C90A – Config 3
King Air C90A – Config 4
King Air C90A – Config 5
King Air C90A – Config 6
King Air C90A – Config 7
King Air C90A – Config 8
King Air C90A – Config 9
King Air C90A – Config 10
King Air C90A – Config 11
King Air C90A – Config 12
King Air C90A – Config 13
King Air C90A – Config 14
King Air C90A – Config 15
King Air C90A – Config 16
King Air C90GT – Config 17
King Air C90GT – Config 18

The following options appear at the System Upload page within the FILE menu, when the "C90-Weight and Airspeed" choice is selected from the AIRFRAME menu. These options are associated with various Blackhawk/Raisbeck configurations or unique to aircraft serial numbers. If reloading configuration, refer to Table 5 of the General Arrangement Drawing, listed in Table 1-2, to identify the appropriate configuration for your aircraft.

Optional Weight & Airspeed Configurations For Software Version 0636.01	**Optional Weight & Airspeed Configurations For Software Version 0636.02 and Sub.**
King Air C90 –Weight LJ 1063-1137, 1146	*King Air C90 – MTOW 9,650 lbs*
King Air C90 – 90-206CGW	*King Air C90 – MTOW 10,100 lbs*
King Air C90 – 05-206CGW	*King Air C90 – MTOW 10,350 lbs*
King Air C90 – Airspeed LJ 1063-1137,1146	*King Air C90 – MTOW 10,500 lbs*
	King Air C90 – Airspeed LJ 1063-1137, 1146

The following options appear at the System Upload page within the FILE menu, when the "C90-Options" choice is selected from the AIRFRAME menu.

King Air C90 – ADF-60 Option

King Air C90 – DME-42 Option

King Air C90 – Traffic System Option

King Air C90 - WX 500 Option

King Air C90 – GTX 33 ES Option

Table 3-2. LRU to Configuration File Relationship

LRU			PFD						MFD	GCU 475	GMC 710	GIA 63W #1		GIA 63W #2		GMA 1347 #1	GMA 1347 #2	GTX 33 #1	GTX 33 #2	GEA 71 #1	GEA 71 #2	GDC 74B #1	GDC 74B #2	GDL 69A	GWX 68
FILE NAME			AIRFRAME	A/F ALERTS	SYSTEM	MANIFEST	PFD 1	PFD 2	MFD1	GCU	GMC	GIA1	AUDIO	GIA2	AUDIO	GMA_PIL	GMA_COPIL	GTX1	GTX2	GEA1	GEA2	GDC_PIL	GDC_COPIL	GDL_69	GWX
CONFIGURATIONS	Default Configuration		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Optional Configurations	Configuration 1	X																						
		Configuration 2	X																						
		Configuration 3	X																						
		Configuration 4	X																						
		Configuration 5	X																						
		Configuration 6	X																						
		Configuration 7	X																						
		Configuration 8	X																						
		Configuration 9	X																						
		Configuration 10	X																						
		Configuration 11	X																						
		Configuration 12	X																						
		Configuration 13	X																						
		Configuration 14	X																						
		Configuration 15	X																						
		Configuration 16	X																						
		Configuration 17	X																						
		Configuration 18	X																						
		Airspeed LJ 1063-1137,1146	X																						
		*MTOW 9,650 lbs	X																						
		*MTOW 10,100 lbs	X																						
		*MTOW 10,350 lbs	X																						
		*MTOW 10,500 lbs	X																						
		Traffic System Option												X											
		WX 500 Option												X											
		ADF-60 Option												X		X	X								
		DME-42 Option										X				X									
		GTX 33 ES Option										X		X				X	X						

*** Airframe Weight Configurations shown for C90 System Software PN 006-B0636-02 and subsequent approved software revisions.**

IMPORTANT!

Certain software and configuration files are REQUIRED to be re-loaded during maintenance that involves removal and replacement of G1000 equipment.

Refer to Section 7 for re-configuration requirements for each G1000 LRU. Pay special attention to the configuration of options for the G1000.

NOTE

To enable the TAWS function, a separate "TAWS Enable" SD Card is required. See the appropriate General Arrangement drawing for card part number. When the TAWS option is loaded, note that it overwrites the AIRFRAME and AIRFRAME ALERTS configuration files. If, during maintenance, a PFD configuration file is ever reloaded, the TAWS option must be reactivated. See Section 3.9.8 for instructions on reactivating TAWS.

3.8.5 Configuration File Storage

The G1000 system is designed to store all configuration settings in various places so that the configuration is retained in the aircraft during maintenance of units.

During system configuration, each file is sent directly to the applicable LRU where it is stored in local LRU memory (except GRS 77 & GDC 74B). Each file is also stored in the PFD internal memory. The applicable PFD also sends a copy of all configuration files to the 'Master Configuration module', located in the connector backshell (see Section 6.16). If the PFD is replaced, the configuration module retains all configuration files in the aircraft.

NOTE

The GRS 77 AHRS and GMU 44 Magnetometer do not have a configuration file. However, these LRUs do store calibration data acquired during the post installation checkout, which are characteristic to the specific installation. While performing maintenance on these units, re-calibration may be required. See Section 7.7.1 for more information on re-calibration criteria.

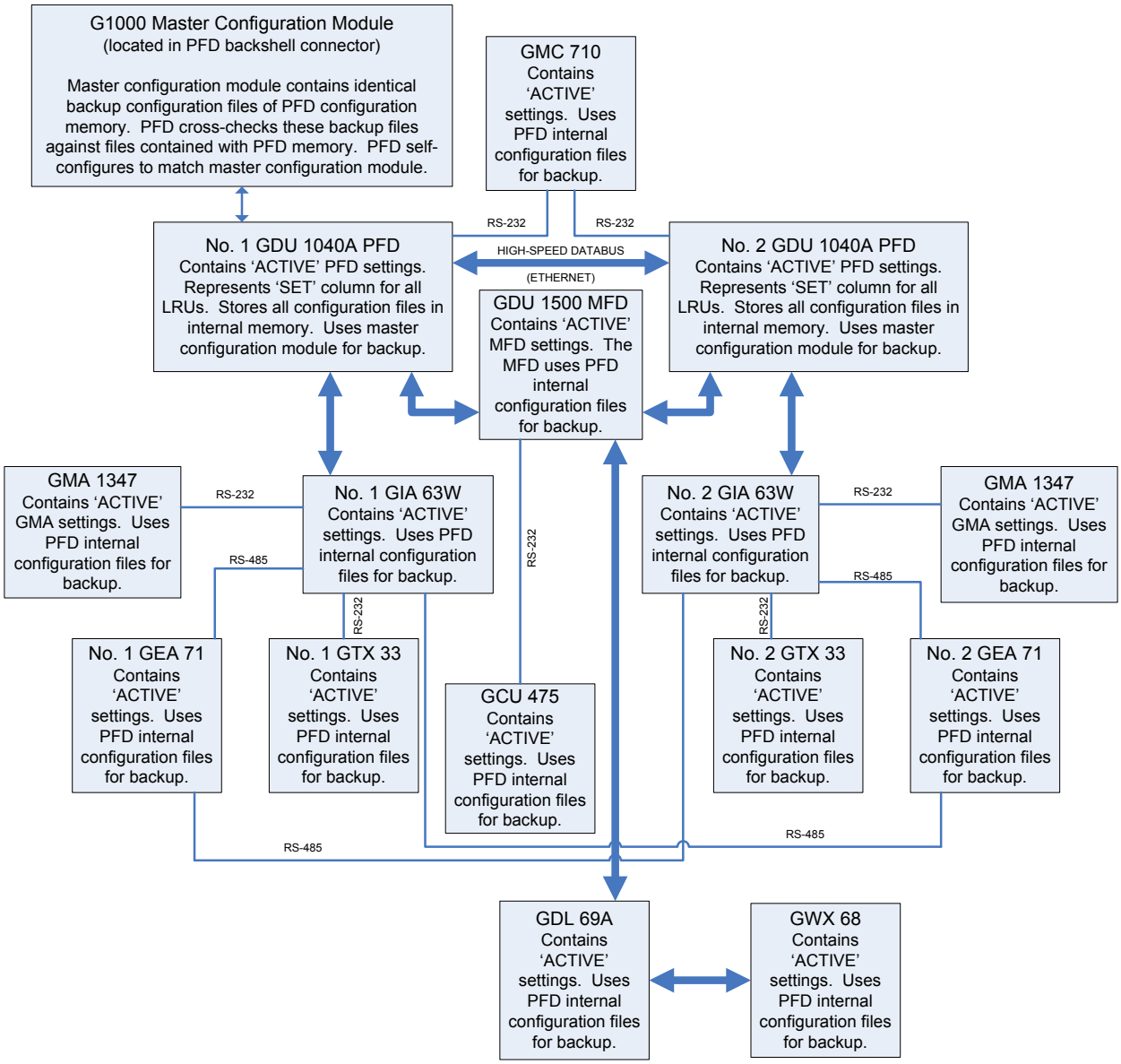

G1000 Master Configuration Module
(located in PFD backshell connector)
Master configuration module contains identical backup configuration files of PFD configuration memory. PFD cross-checks these backup files against files contained with PFD memory. PFD self-configures to match master configuration module.
GMC 710
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
RS-232
RS-232
No. 1 GDU 1040A PFD
Contains 'ACTIVE' PFD settings. Represents 'SET' column for all LRUs. Stores all configuration files in internal memory. Uses master configuration module for backup.
HIGH-SPEED DATABUS
(ETHERNET)
No. 2 GDU 1040A PFD
Contains 'ACTIVE' PFD settings. Represents 'SET' column for all LRUs. Stores all configuration files in internal memory. Uses master configuration module for backup.
GDU 1500 MFD
Contains 'ACTIVE' MFD settings. The MFD uses PFD internal configuration files for backup.
GMA 1347
Contains 'ACTIVE' GMA settings. Uses PFD internal configuration files for backup.
RS-232
No. 1 GIA 63W
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
RS-485
RS-232
RS-232
No. 2 GIA 63W
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
RS-232
GMA 1347
Contains 'ACTIVE' GMA settings. Uses PFD internal configuration files for backup.
RS-485
RS-232
No. 1 GEA 71
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
No. 1 GTX 33
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
GCU 475
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
No. 2 GTX 33
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
No. 2 GEA 71
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
RS-485
RS-485
GDL 69A
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.
GWX 68
Contains 'ACTIVE' settings. Uses PFD internal configuration files for backup.

Figure 3-15. G1000 LRU Configuration File Storage

The GRS 77 and GDC 74B configuration modules function differently than the rest of the system. The GDC 74B's configuration file is loaded directly to GDC internal memory. A copy of the file is stored in the GDC configuration module.

The GRS 77 configuration module does not store any configuration settings. Instead, it stores calibration data recorded during installation calibration procedures.

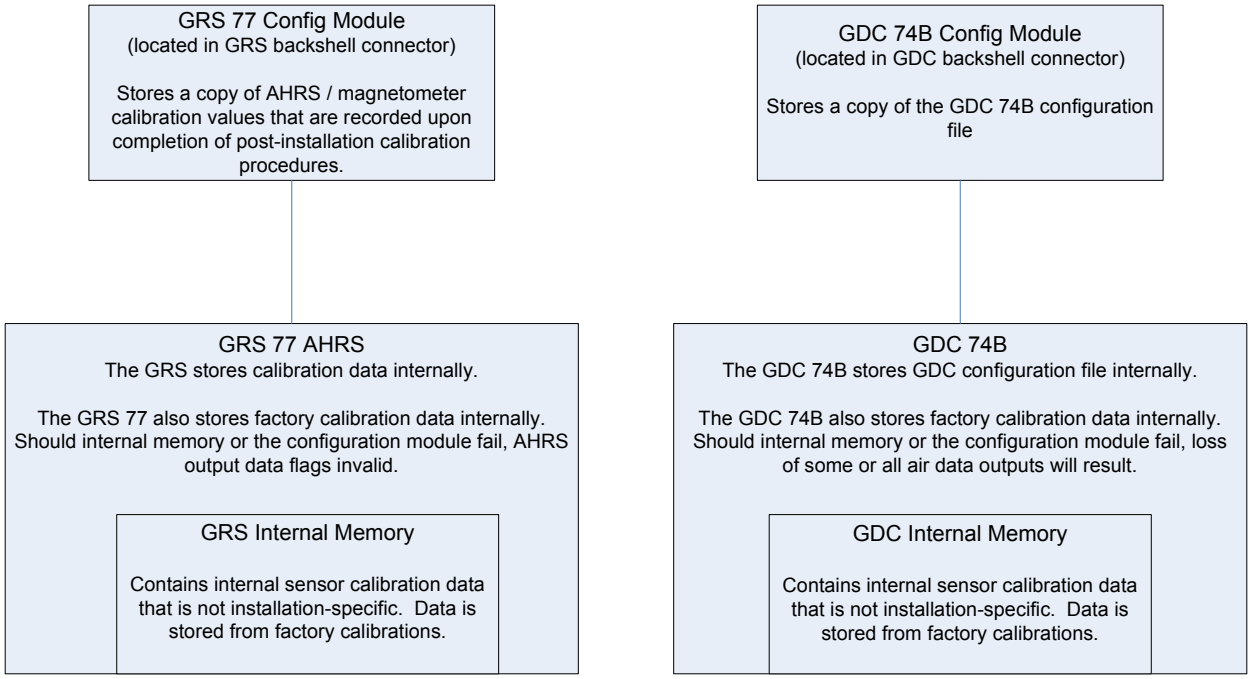

GRS 77 Config Module
(located in GRS backshell connector)
Stores a copy of AHRS / magnetometer calibration values that are recorded upon completion of post-installation calibration procedures.
GDC 74B Config Module
(located in GDC backshell connector)
Stores a copy of the GDC 74B configuration file
GRS 77 AHRS
The GRS stores calibration data internally.
The GRS 77 also stores factory calibration data internally. Should internal memory or the configuration module fail, AHRS output data flags invalid.
GRS Internal Memory
Contains internal sensor calibration data that is not installation-specific. Data is stored from factory calibrations.
GDC 74B
The GDC 74B stores GDC configuration file internally.
The GDC 74B also stores factory calibration data internally. Should internal memory or the configuration module fail, loss of some or all air data outputs will result.
GDC Internal Memory
Contains internal sensor calibration data that is not installation-specific. Data is stored from factory calibrations.

Figure 3-16. GRS/GDC Configuration Settings Storage

3.9 G1000 Software/Configuration Procedure

This section summarizes the procedures required to load software and configuration files to the G1000. It is intended to work as a central guide for technicians to use while performing maintenance on the aircraft. In sections of this manual where software is required to be reloaded, these sections will make reference back to this Section for instructions. The technician should use proper judgment regarding the context of maintenance required while following this section.

The following diagram depicts an overview of the software/configuration sequence for the G1000 system. This applies mostly to a new G1000 system which has not previously been powered up and is for informative purposes only.

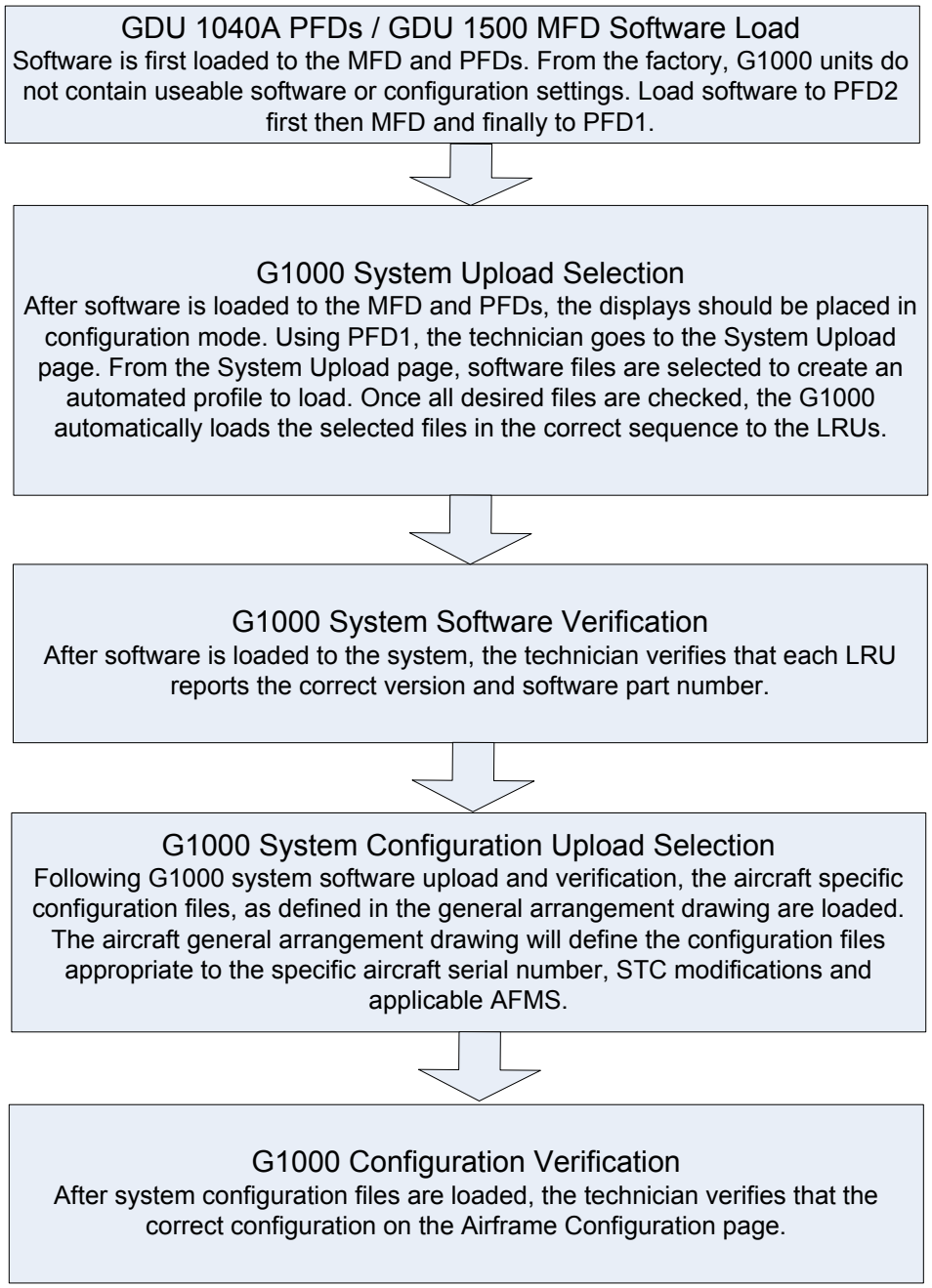

GDU 1040A PFDs / GDU 1500 MFD Software Load
Software is first loaded to the MFD and PFDs. From the factory, G1000 units do not contain useable software or configuration settings. Load software to PFD2 first then MFD and finally to PFD1.
G1000 System Upload Selection
After software is loaded to the MFD and PFDs, the displays should be placed in configuration mode. Using PFD1, the technician goes to the System Upload page. From the System Upload page, software files are selected to create an automated profile to load. Once all desired files are checked, the G1000 automatically loads the selected files in the correct sequence to the LRUs.
G1000 System Software Verification
After software is loaded to the system, the technician verifies that each LRU reports the correct version and software part number.
G1000 System Configuration Upload Selection
Following G1000 system software upload and verification, the aircraft specific configuration files, as defined in the general arrangement drawing are loaded. The aircraft general arrangement drawing will define the configuration files appropriate to the specific aircraft serial number, STC modifications and applicable AFMS.
G1000 Configuration Verification
After system configuration files are loaded, the technician verifies that the correct configuration on the Airframe Configuration page.

Figure 3-17. Software/Configuration Overview

3.9.1 MFD & PFD Software Load

Follow this procedure to load software to either PFD or the MFD.

1. With the G1000 and GFC 700 powered on, pull the MFD, PFD 1 (PRI), PFD 1 (SEC), and PFD 2 circuit breakers.
2. Insert the correct G1000/C90 Loader Card into top card slot in the desired PFD or MFD.

NOTE

Refer to General Arrangement Drawing, listed in Table 1-2, for correct loader card part number.

NOTE

If loading software to all displays, it is preferred to load PFD 2 first, followed by the MFD and then PFD 1.

3. While holding the ENT key on the display, restore power by closing the appropriate circuit breaker(s).
4. When the words INITIALIZING SYSTEM appear in the upper left corner of the display, release the ENT key.
5. Press the ENT key or the sofkey labeled 'YES' to acknowledge the following prompt (see also note below for MFD):

NOTE

For the MFD, use the far right soft key on the MFD in lieu of the ENT key where called out in Steps 3 through 6. The ENT key for the MFD is located on the GCU 475 FMS controller and will not function prior to software load.

6. The following screen is displayed.

7. New software is loaded to the display. When complete, the display starts in configuration mode displaying the "System Status" page. Do not remove power.
8. Remove the G1000/C90 Loader Card from the display and insert it into the top card slot on another display if desired. Repeat Steps 3 through 6 as needed.

IMPORTANT!

For the rest of the software/configuration procedure, do not operate the MFD or PFD 2 while loading software or configuration files unless specifically instructed to do so. A failed or cancelled load may result.

3.9.2 G1000 System Software Upload

The System Upload page allows a technician to load LRU software and system configuration files individually or in an automated sequence. Depending on what maintenance is performed, software and/or configuration files may need to be reloaded to LRUs. Follow the steps below as a guide to use the System Upload page.

IMPORTANT!

Do not allow power to be removed from the system when loading software. Remove power only when instructed by the following procedure. As a general rule, all displays should be in the same mode (configuration or normal) unless instructed otherwise.

1. On PFD 1, go to the System Upload page using the small FMS knob.
2. Activate the cursor and use the small FMS knob to highlight 'C90' in the AIRFRAME field. Press the ENT key to select the airframe type.

IMPORTANT!

Ensure that the correct airframe type is selected before proceeding; otherwise, incorrect configuration information will be loaded.

3. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to active the drop-down menu. Move the cursor to highlight 'King Air C90–Baseline' and press ENT.

Figure 3-18. System Upload Page

4. The PRODUCT window will populate and display software and default configuration file lists for each G1000 LRU. The LRU VERS column shows the currently loaded software version in the LRU, whereas the CARD VERS column shows the LRU software version stored on the loader card. Each check designates a file to be loaded to the G1000.

If an inequality between the LRU VERS and CARD VERS columns is detected, the SOFTWARE and CONFIGURATION boxes will be pre-selected (checked) for each LRU reporting a different software version than the one on the card.

The following softkeys provide an easy way to select files:

CHK ALL: Selects all files, both configuration and software

CHK SW: Selects all SW files only.

CHK CFG: Selects all configuration files only.

CLR ALL: Clears all selections.

LOAD: Starts the software loading process.

NOTE

If this is the first time loading software and configuration to a new installation, it is advised to leave all check boxes selected. However, for maintenance purposes, it may not be necessary to reload all software and configuration files. The technician should be sure of the software requirements and load the appropriate files, including any options (see Section 3.9.4). If there is any doubt, the CHK ALL softkey is recommended.

5. After verifying that the desired software and configuration files are checked, press the LOAD softkey. The G1000 system automatically begins loading software and default configuration files to the selected LRUs in the proper order.
6. When the system finishes loading, it prompts the technician accordingly. Press the ENT key to acknowledge that the upload is finished:

7. Verify that each column indicates in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.

3.9.3 Software Check

Anytime software and configuration loading procedures are accomplished during maintenance, it is highly recommended to conduct a final software review of the system.

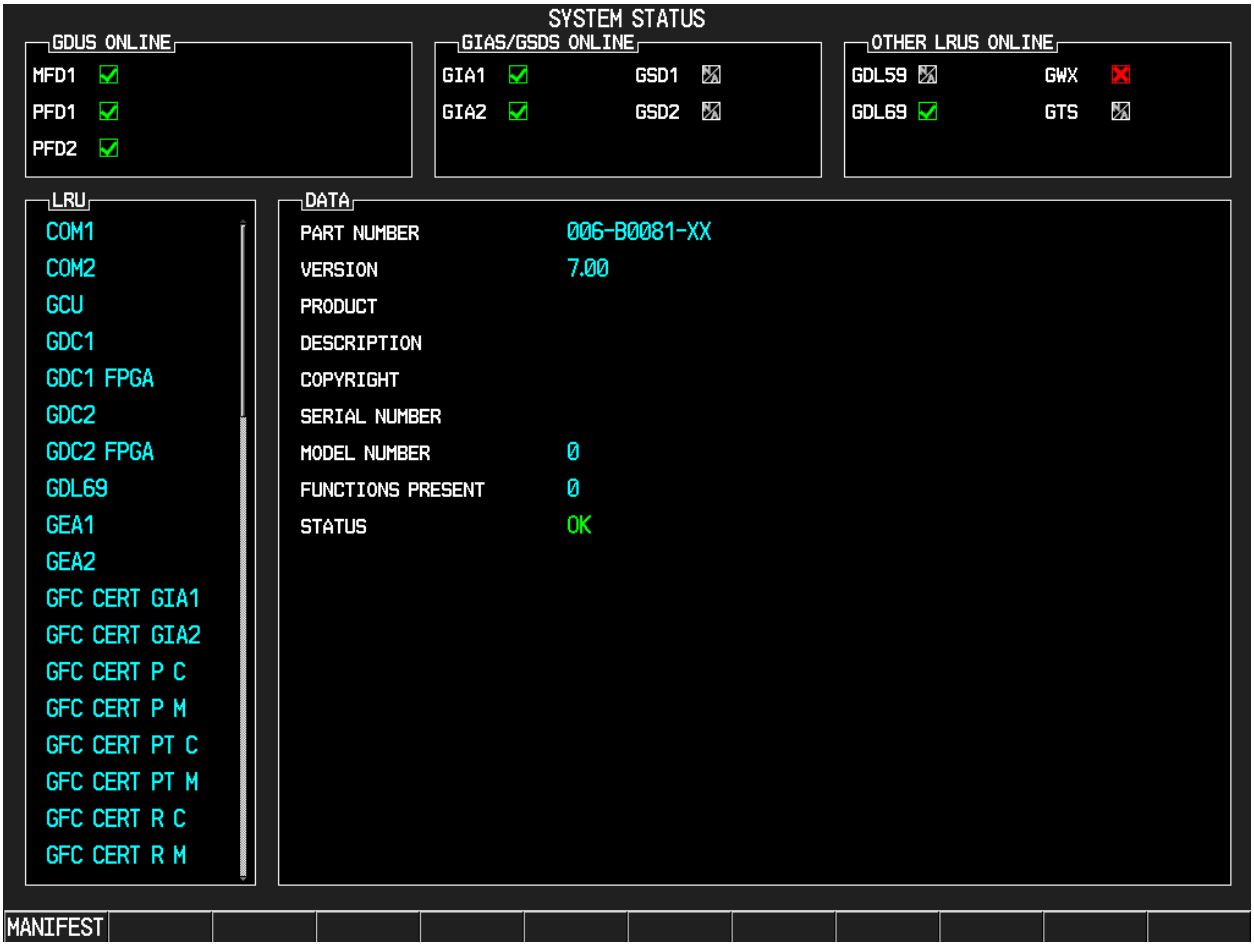


Figure 3-19. System Status

1. Start the PFD in Configuration Mode.
2. Go to the System Status page using the FMS knob. Activate the cursor and toggle to the LRU window.
3. Highlight each of the following items in the LRU window, and verify that the software part number and version matches the information in General Arrangement drawing listed in Table 1-2. Record the results on the next page.
4. De-activate the cursor.

IMPORTANT!

If any software version and/or part number does not match those specified by the General Arrangement drawing, or if the software is not successfully loaded, DO NOT continue with installation procedures. Troubleshoot and resolve the issue before continuing (see Section 5.19).

Control & Display

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
PFD 1	_____	PFD 2 FPGA	_____	GCU	_____
PFD 1 FPGA	_____	MFD1	_____	GMC	_____
PFD 2	_____	MFD1 FPGA	_____		

CNS:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GIA1	_____	GPS2	_____	GDL69	_____
GIA2	_____	GTX1	_____	GWX	_____
GMA1	_____	GTX2	_____	GWX FPGA	_____
GMA2	_____	GIA1 AUDIO	_____		
GPS1	_____	GIA2 AUDIO	_____		

Sensors:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GDC1	_____	GMU2	_____	GEA1	_____
GDC1 FPGA	_____	GMU2 FPGA	_____	GEA2	_____
GDC2	_____	GRS1	_____		
GDC2 FPGA	_____	GRS1 FPGA	_____		
GMU1	_____	GRS2	_____		
GMU1 FPGA	_____	GRS2 FPGA	_____		

AFCS SYSTEM:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GSA PTCH CTL	_____	GSA PTCH TRM M	_____	GSA YAW CTL	_____
GSA PTCH MON	_____	GSA ROLL CTL	_____	GSA YAW MON	_____
GSA PTCH TRM C	_____	GSA ROLL MON	_____		

AFCS CERT GAINS:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GFC CERT GIA1	_____	GFC CERT PT C	_____	GFC CERT YC	_____
GFC CERT GIA2	_____	GFC CERT PT M	_____	GFC CERT YM	_____
GFC CERT PC	_____	GFC CERT RC	_____		
GFC CERT PM	_____	GFC CERT RM	_____		

3.9.4 Loading Airframe Options

After the default configuration is loaded to the G1000, the technician must check and verify which equipment or installation options exist on the aircraft. See the options list in 3.8.4.1.

If the C90A/C90GT aircraft being updated requires a different airframe configuration or is equipped with any additional equipment options, follow this procedure to load them.

NOTE

ChartView and TAWS options are covered in a separate section. See Sections 3.9.7 and 3.9.8 for ChartView and TAWS, respectively.

NOTE

Coordinate configuration loading and activation with Sections 5, 6 and 7 as appropriate for the actions being performed.

3.9.4.1 Determining Airframe Configuration

Aircraft in the following serial number range that have not been modified by the STCs listed below do not require additional airframe configuration. Proceed to section 3.9.4.3 for option configuration.

Serial number range –

- 1361, 1363-1366, 1368-1372, 1374-1376, 1378-1383, 1385, 1387-1388, 1390-1393, 1395-1396, 1398-1402, 1404-1410, 1412-1424,1426-1430, 1432-1497, 1499-1537, 1539, 1540-1726, 1728-1753,1755

STCs -

- SA10341SC Opt. 2- Installation of Pratt & Whitney Canada PT6A-135A engines and Hartzell HC-D4N-3C/D9290(S)(K) or HC-E4N-3N/D8990S(K) propellers.
- SA10364SC - Installation of Pratt & Whitney Canada PT6A-135A engines and McCauley 4HFR34C762/94LMA-4 or 4HFR34C768/94LMA-4 propellers.
- SA3593NM - Installation of Hartzell/Raisbeck quiet turbofan propeller.

For C90GT aircraft or aircraft modified by Raisbeck and/or Blackhawk STCs above, refer to Table 5 of the General Arrangement drawing (listed in Table 1-2) to determine applicable configuration.

Example-

- A/C serial number - 1362
- A/C modified by - SA3593NM (Raisbeck) STC with AFMS 86-206C
- Configuration to be loaded – King Air C90A Configuration 7

Once the correct configuration is determined, load the appropriate C90A/C90GT configuration per section 3.9.4.1.1 below.

IMPORTANT!

If the aircraft being modified has incorporated any modifications beyond factory configuration or the STCs listed above that effect engine or airspeed limitation, your configuration may not be supported at this time. It is the responsibility of the installer to ensure compatibility with existing modifications.

3.9.4.1.1 Loading Airframe Configuration

1. While in configuration mode and loader card inserted in the top card slot of PFD 1, select the "**System Upload**" page using the small FMS knob.

2. Activate cursor and rotate small knob to display drop down menu. Highlight "**C90-Configurations**" and press **ENT** key on PFD 1.

3. Verify cursor drops down to the file box. Rotate the small FMS knob to view the list of available C90 configurations.

4. Use the FMS small knob to select the correct configuration file as determined above. Press **ENT**.
5. Verify the correct configuration file is displayed in the "File" window (for example "King Air C90A – Config 7") then press "**LOAD**".
6. Monitor load progress. Verify software load completes without errors as indicated by the following:

    a. Green "PASS" in Configuration column.

    a. "Upload Complete…….COMPLETE" in the summary box.

7. Select **ENT** key on PFD 1 to acknowledge upload complete.

3.9.4.1.2 Airframe Configuration Load Confirmation

1. Use the large FMS knob to select the GDU page group and the small FMS knob to select "**AIRFRAME CONFIGURATION**" page.

2. Verify the correct airframe configuration, as loaded above, is displayed in the "IDENTIFICATION" window.

3.9.4.2 Weight and Airspeed Configuration

In addition to the airframe configuration loaded above, certain installations will require additional steps to configure the G1000 for airframe weight and airspeed markings.

3.9.4.2.1 Determining the Correct Weight Configuration

The C90A G1000 system software airframe configurations have specific default MTOW, MZFW, and maximum landing weight values obtained from the effective AFMS for each configuration. Table 3-3 below lists the MTOW, MZFW, and maximum landing weights for each airframe configuration. Reference Table 5 in the General Arrangement Drawing listed in Table 1-2 for airframe configuration information.

DEFAULT AIRFRAME WEIGHT CONFIGURATIONS			
MTOW	**MZFW**	**Max Landing Weight**	**Included In Airframe Configurations**
10,100 lbs	No Limitation	9,600 lbs	Baseline, 1, 2, 3, 4, 5, 6, 7, 8, 17
10,100 lbs	9,000 lbs	9,700 lbs	9, 10
10,350 lbs	9,000 lbs	9,700 lbs	11, 12, 13, 14, 15, 16
10,500 lbs	9,000 lbs	9,700 lbs	18

Table 3-3. Default Airframe Weight Configurations

If your airframe configuration will require a weight configuration other than the default airframe weight configuration listed in Table 3-3, then select an optional airframe weight configuration from Table 3-4 or Table 3-5 below.

NOTE

Consult the aircraft AFMS and/or permanent maintenance records to determine the correct airframe weight configuration for your aircraft installation.

If your installation is using C90 G1000 System Software PN 006-B0636-01, Version 0636.01, then select an optional airframe weight configuration from Table 3-4. Proceed to Section 3.9.4.2.2, Loading Airframe Weight Configurations.

If your installation is not using C90 G1000 System Software PN 006-B0636-01, Version 0636.01, then proceed to Table 3-5 .

OPTIONAL AIRFRAME WEIGHT CONFIGURATIONS FOR SW VERSION 0636.01			
MTOW	**MZFW**	**Max Landing Weight**	**Optional Weight Configuration**
9,650 lbs	No Limitation	9,168 lbs	King Air C90 – Weight LJ 1063-1137, 1146
10,100 lbs	9,000 lbs	9,700 lbs	King Air C90 – 90-206CGW
10,350 lbs	9,000 lbs	9,700 lbs	King Air C90 – 05-206CGW

Table 3-4. Optional Airframe Weight Configurations for SW Version 0636.01

If your installation is using C90 G1000 System Software PN 006-B0636-02, Version 0636.02 or subsequent approved software versions, then select an optional airframe weight configuration from Table 3-5. Proceed to Section 3.9.4.2.2, Loading Airframe Weight Configurations.

OPTIONAL AIRFRAME WEIGHT CONFIGURATIONS FOR SW VERSION 0636.02 AND SUBSEQUENT APPROVED REVISIONS			
MTOW	**MZFW**	**Max Landing Weight**	**Optional Weight Configuration**
9,650 lbs	No Limitation	9,168 lbs	King Air C90 – MTOW 9,650 lbs
10,100 lbs	9,000 lbs	9,700 lbs	King Air C90 – MTOW 10,100 lbs
10,350 lbs	9,000 lbs	9,700 lbs	King Air C90 – MTOW 10,350 lbs
10,500 lbs	9,000 lbs	9,700 lbs	King Air C90 – MTOW 10,500 lbs

Table 3-5. Optional Airframe Weight Configurations for SW Version 0636.02

3.9.4.2.2 Loading Airframe Weight Configurations

Follow this procedure to enable the airframe weight configuration.

1. While in configuration mode and loader card inserted in the top card slot of PFD1, select the "System Upload" page using the PFD1 small FMS knob.
2. Activate cursor in AIRFRAME window and rotate PFD1 FMS inner knob to display drop down menu. Highlight "**C90-Weight and Airspeed**" and press **ENT** key on PFD1.
3. Verify cursor drops down to the file box. Rotate the inner FMS knob to view the list of available C90 configurations.
4. Use the FMS inner knob to select the correct airframe weight configuration file from either as determined in Table 3-4 or Table 3-5 above. Press **ENT**.
5. Verify the correct configuration file is displayed in the "FILE" window (for example "King Air C90 – MTOW 10,350 lbs") then press "**LOAD**".
6. Monitor load progress. Verify software load completes without errors as indicated by the following:
    a. Green "PASS" in Configuration column.
    b. "Upload Complete…….COMPLETE" in the summary box.
7. Select PFD1 **ENT** key to acknowledge upload complete.

3.9.4.2.3 Loading Airspeed Indication Marking Configuration

Aircraft serial numbers LJ-1063 through LJ-1137 and LJ-1146 must load the airspeed configuration file King Air C90 – Airspeed LJ 1063 – 1137,1146 .

All other aircraft not included in this serial number range are not required to load this additional airspeed indication marking configuration.

Follow this procedure to enable the airspeed marking configuration.

1. While in configuration mode and loader card inserted in the top card slot of PFD1, select the "**System Upload**" page using the PFD1 small FMS knob.

2. Activate cursor in AIRFRAME window and rotate PFD1 FMS inner knob to display drop down menu. Highlight "**C90-Weight and Airspeed**" and press **ENT** key on PFD1.

3. Verify cursor drops down to the file box. Rotate the inner FMS knob to view the list of available C90 configurations.

4. Use the FMS inner knob to select the airspeed indicator marking configuration file, "**King Air C90 – Airspeed LJ 1063 – 1137,1146**". Press **ENT**.

5. Verify the correct configuration file is displayed in the "FILE" window (for example "King Air C90 – Airspeed LJ 1063 – 1137,1146") then press "**LOAD**".

6. Monitor load progress. Verify software load completes without errors as indicated by the following:

    a. Green "PASS" in Configuration column.

    b. "Upload Complete…….COMPLETE" in the summary box.

7. Select PFD1 **ENT** key to acknowledge upload complete.

3.9.4.2.4 Airspeed Configuration Load Confirmation

1. Accomplish Airspeed Test in Section 7.6.2 to verify the correct airspeed configuration, as loaded in Section 3.9.4.2.3.

Aircraft LJ-1063 through LJ-1137, and LJ-1146: Vyse = 107 kts, Vmca = 90 kts , Vs1 = 89 kts

3.9.4.3 TIS Configuration

Follow this procedure to re-enable the TIS function if TAS has been enabled for the G1000 system.

TIS is a default G1000 system function. If TAS has not been enabled, the following procedure is not required to enable the TIS function. If TAS has previously been enabled, perform the procedure below to return TIS function to the G1000 system. The G1000 can only be configured for TIS or TAS but not both.

IMPORTANT!

This procedure will re-load the C90A/C90GT baseline configuration. Any options previously enabled such as DME, ADF etc will need to be re-enabled per the instructions contained in this document.

1. On PFD 1, select the "**System Upload**" page using the small FMS knob.

2. Activate the cursor and use the small FMS knob to highlight "**C90**" in the AIRFRAME field. Press the **ENT** key to select the airframe type.

IMPORTANT!

Ensure that the correct airframe type is selected before proceeding; otherwise, incorrect configuration information will be loaded.

3. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the drop-down menu. Move the cursor to highlight "**King Air C90 Baseline**" and press **ENT**.

NOTE

The PRODUCT window displays information regarding each G1000 LRU. The LRU column depicts the reported software version of the LRU, whereas the CARD VERS column shows the LRU software version stored on the Loader Card. The SOFTWARE and CONFIGURATION columns default to having all required boxes checked. Each checked file is automatically loaded to the correct G1000 LRU.

4. Press the **LOAD** softkey.

5. Observe software loading progress and verify software load completes without errors as indicated by the following:

    b. Green "PASS" in Configuration column.

    a. "Upload Complete…….COMPLETE" in the summary box.

6. Press **ENT** to acknowledge the "Upload Complete" box.

7. Reload all C90A/C90GT options as appropriate per instructions contained within this document

3.9.4.4 Traffic System Option Configuration

3.9.4.4.1 Traffic System Option

Follow this procedure to enable the traffic system function for the G1000 system.

NOTE

The G1000 can only be configured for TIS or TAS but not both. Performing this procedure will automatically disable the TIS function.

2. While in configuration mode and the loader card is inserted in the top card slot of the PFD 1, select the "**System Upload**" page on PFD 1 using the small FMS knob.

3. Activate cursor and rotate small knob to display drop down menu. Verify "**C90-Options**" is highlighted and press **ENT** key on PFD 1.

4. Verify cursor drops down to the file box. Rotate the small FMS knob to view the list of available C90 options.

5. Use the FMS small knob to select "**King Air C90 – Traffic System Option**". Press ENT key on PFD 1.

6. Verify the "**King Air C90 – Traffic System Option**" configuration file is displayed in the "File" window. Press "**LOAD**".

7. Monitor load progress. Verify software load completes without errors as indicated by the following:

    a. Green "PASS" in Configuration column.

    b. "Upload Complete…….COMPLETE" in the summary box.

8. Select **ENT** on PFD 1 to acknowledge upload complete.

3.9.4.4.2 Configuration of Navigation Map for Traffic System

1. With the MFD in Normal Mode, use the GCU FMS knob to select the Navigation Map page then press **GCU MENU** key to display the PAGE MENU.

2. Turn the small right knob to select or verify selected 'Map Setup' and press the **ENT** key and verify TRAFFIC is selected ON.

3. Verify the flashing cursor highlights the GROUP' field.

4. Turn the small FMS knob to select Traffic and press **ENT** on the GCU.

5. Turn the large FMS knob to select Traffic Mode option **ALL TRAFFIC**.

6. Turn the small FMS knob to select the desired option and press the **ENT** key on the GCU. Repeat the step for Traffic Symbol and Traffic Label. Ensure TRAFFIC SMBL is 300NM and TRAFFIC LBL is 300NM.

7. Return to the Map Page by pressing the FMS knob or momentarily pressing and holding the **CLR** key. Deactivate cursor.

3.9.4.5 Stormscope (WX-500) Option Configuration

3.9.4.5.1 Stormscope (WX-500) Option

Follow this procedure to enable the WX-500 (Stormscope) function for the G1000 system

1. While in configuration mode on PFD 1 and loader card inserted into top slot of PFD 1, select the "**System Upload**" page using the PFD 1 small FMS knob.

2. Activate cursor and rotate small knob to display drop down menu. Verify "**C90-Options**" is highlighted and press **ENT** on PFD 1.

3. Verify cursor drops down to the file box. Rotate the small FMS knob to view the list of available C90 options.

4. Use the FMS small knob to select "**King Air C90 – WX 500 Option**". Press **ENT** on PFD 1.

5. Verify the "**King Air C90 – WX 500 Installation Option**" configuration file is displayed in the "File" window. Press "**LOAD**".

6. Monitor load progress. Verify software load completes without errors as indicated by the following:

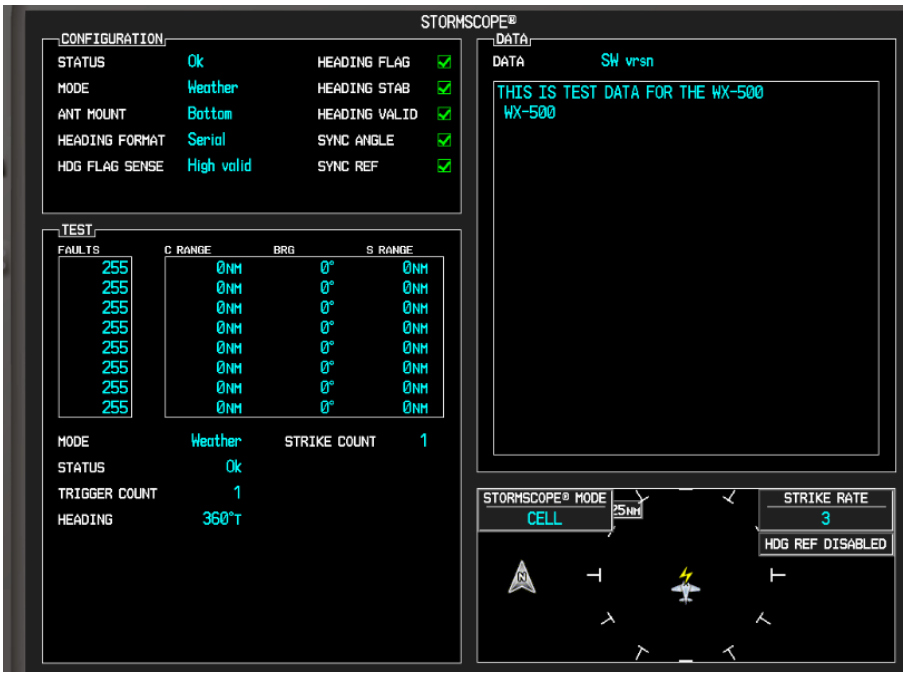
    a. Green "PASS" in Configuration column.

    b. "Upload Complete…….COMPLETE" in the summary box.

7. Select **ENT** on PFD 1 to acknowledge upload complete. Deactivate cursor.

3.9.4.5.2 WX-500 Stormscope Configuration Load Confirmation.

1. With PFD 1 in Configuration Mode, use the PFD 1 large FMS knob to select OTHER and the Stormscope configuration page.



StormScope Configuration Page (Reference Only)

2. Activate the cursor and highlight the DATA field. Use the small FMS knob to select 'Config' and press the ENT key on the MFD.
3. Verify that the DATA window shows the following:

Hdg: None:	J3-1	Jumper
	J3-2	Jumper
Hdg Valid Flag		No Fla
Flag Sense		+invld
	J3-4	Open
Hdg Value	<aircraft heading>	
Inhibit Line	Off	
Antenna Mount	Bottom	
	J3-3	Open

4. Deactivate the cursor.

NOTE

The DATA window is only updated once every five seconds.

3.9.4.6 ADF – 60 Option Configuration

1. While in configuration mode on PFD 1 and with the loader card in the top slot of PFD 1, use the large FMS knob to select the **SYSTEM** group. Select "**SYSTEM UPLOAD**" page using the small FMS knob.

2. Activate cursor and rotate small knob to display drop down menu. Verify "**C90-Options**" is highlighted and press **ENT** on PFD 1.

3. Verify cursor drops down to the file box. Rotate the small FMS knob to view the list of available C90 options.

4. Use the FMS small knob to select "**King Air C90 – ADF-60 Option**". Press **ENT** on PFD 1.

5. Verify the "**King Air C90 – ADF-60 Option**" configuration file is displayed in the "File" window. Press "**LOAD**" on PFD 1.

6. Monitor load progress. Verify software load completes without errors as indicated by the following:

    a. Green "PASS" in Configuration column for GIA2, GMA PIL, and GMA COPIL.

    b. "Upload Complete…….COMPLETE" in the summary box.

7. Select **ENT** on PFD 1 to acknowledge upload complete. Deactivate cursor.

3.9.4.7 DME 42 Option Configuration

1. While in configuration mode on PFD 1 and with the loader card in the top slot of PFD 1, use the large FMS knob to select the SYSTEM group. Select "**SYSTEM UPLOAD**" page using the small FMS knob.

2. Activate cursor and rotate small knob to display drop down menu. Verify "**C90-Options**" is highlighted and press **ENT** on PFD 1.

3. Verify cursor drops down to the file box. Rotate the small FMS knob to view the list of available C90 options.

4. Use the FMS small knob to select "**King Air C90 – DME-42 Option**". Press **ENT** on PFD 1.

5. Verify the "**King Air C90 – DME-42 Option**" configuration file is displayed in the "File" window. Press "**LOAD**" on PFD 1.

6. Monitor load progress. Verify software load completes without errors as indicated by the following:

    a. Green "PASS" in Configuration column for GIA1, GMA PIL, and GMA COPIL.

    b. "Upload Complete…….COMPLETE" in the summary box.

7. Select **ENT** on PFD 1 to acknowledge upload complete. Deactivate cursor.

3.9.4.8 GTX 33 Extended Squitter (ES) Option Configuration

NOTE

The GTX 33 Transponder Part Number 011-00779-10 will require an upgrade to support ES functionality prior to enabling the GTX 33 ES Option and must be routed to the Garmin Service Center for this upgrade. If GTX 33 ES Transponder Part Number 011-00779-30 is installed in the aircraft, then the GTX 33 ES Option can be enabled. Reference the C90 General Arrangement Drawing 005-00375-22 for GTX 33 Transponder LRU software and version part numbers compatible with extended squitter functionality.

1. While in configuration mode on PFD 1 and with the loader card in the top slot of PFD 1, use the large FMS knob to select the SYSTEM group. Select "**SYSTEM UPLOAD**" page using the small FMS knob.

2. Activate cursor and rotate small knob to display drop down menu. Verify "C90-Options" is highlighted and press **ENT** on PFD 1.

3. Verify cursor drops down to the file box. Rotate the small FMS knob to view the list of available C90 options.

4. Use the FMS small knob to select "**King Air C90 – GTX 33 ES Option**". Press **ENT** on PFD 1.

5. Verify the "**King Air C90 – GTX 33 ES Option**" configuration file is displayed in the "File" window. Press "**LOAD**" on PFD 1.

6. Monitor load progress. Verify software load completes without errors as indicated by the following:

    a. Green "PASS" in Configuration column for GIA1, GIA2, GTX1, and GTX2.

    b. "Upload Complete…….COMPLETE" in the summary box.

7. Select **ENT** on PFD 1 to acknowledge upload complete. Deactivate cursor.

3.9.5 FliteCharts Configuration

Follow this procedure to re-enable FliteCharts function if ChartView has been enabled for the G1000 system.

FliteCharts is a default G1000 system function. Section 3.9.9 installs the Terrain/Obstacle database card, which includes FliteCharts database. If ChartView has not been enabled, the following procedure is not required. If ChartView has previously been enabled, perform the procedure below to return FliteCharts function to the G1000 system.

IMPORTANT!

This procedure will re-load the C90A/C90GT baseline configuration. Any options previously enabled such as DME, ADF etc will need to be re-enabled per the instructions contained in this document.

NOTE

The G1000 can only be configured for FliteCharts or ChartView but not both. Performing this procedure will automatically disable the ChartView function.

1. With PFD 1 in Configuration Mode and the loader card inserted in the top card slot of PFD 1, select the "**System Upload**" page on PFD 1 using the small FMS knob.

2. Activate the cursor and use the small FMS knob to highlight "**C90**" in the AIRFRAME field. Press the **ENT** key to select the airframe type.

3. Once the airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the drop-down menu. Move the cursor to highlight "**King Air C90 Baseline**" and press **ENT**.

   NOTE

   The PRODUCT window displays information regarding each G1000 LRU. The LRU column depicts the reported software version of the LRU, whereas the CARD VERS column shows the LRU software version stored on the Loader Card. The SOFTWARE and CONFIGURATION columns default to having all required boxes checked. Each checked file is automatically loaded to the correct G1000 LRU.

4. Press the **LOAD** softkey.

5. Observe software loading progress and verify software load completes without errors as indicated by the following:

   a. Green "PASS" or N/A in the Configuration column.

   b. "Upload Complete…….COMPLETE" in the summary box.

6. Press **ENT** to acknowledge the "Upload Complete" box.

7. Reload other C90 options as appropriate per instructions contained within this document.

3.9.6 SafeTaxi Configuration

SafeTaxi is loaded and configured on the G1000 by default and needs no more configuring. Section 3.9.9 installs the Terrain/Obstacle database card, which includes SafeTaxi database.

3.9.7 ChartView Configuration

Follow this procedure to re-activate the ChartView option. A ChartView Enable Card, as specified in the General Arrangement Drawing listed in Table 1-2, will be required for this procedure.

NOTE

When the ChartView option is enabled for the first time (normally with the initial STC installation), the G1000 writes its unique system ID to the physical card and locks the files to this unique ID. This prevents the unlock card from ever being used to activate the ChartView feature in other G1000 systems. The unlock card is forever tied to the specific aircraft in which it was used for the first time. For situations where ChartView must be re-activated, this card must be used.

NOTE

The required ChartView databases are subscription-based and are to be procured by the installing agency directly from Jeppesen. This procedure is only required if the ChartView option is purchased by the customer.

NOTE

The G1000 can only be configured for FliteCharts or ChartView but not both. Performing this procedure will automatically disable the FliteCharts option. ChartView databases are required to be installed on the terrain database cards to function (see Section 3.9.9).

1. Remove power from the PFD 1, PFD 2 and MFD by opening the PFD 1 PRI, PFD 1 SEC, PFD 2 and MFD circuit breakers.
2. A ChartView Enable card is required to activate this feature. Insert the ChartView Enable card in the upper slot of the PFD 1.
3. While holding the **ENT** key on PFD 1, PFD 2 and MFD, restore power to the displays by closing the PFD and MFD circuit breakers.
4. When the words INITIALIZING SYSTEM appear in the upper left corner of the displays, release the **ENT** key.
5. On PFD 1, go to the System Upload page using the FMS knob.
6. Activate the cursor. Use the small FMS knob to select **'CONFIGURATION FILES'** in the AIRFRAME field and press the **ENT** key.
7. Highlight the **FILE** field. Use the small FMS knob to select the "**Enable ChartView**" option and press the **ENT** key. Once the option is selected the configuration files in the SECTION field will be displayed. All files should be checked. If not, press the **CHK ALL** softkey.
8. Press the **LOAD** softkey.
9. Monitor the status of the upload. When the upload is finished, press the **ENT** key to acknowledge the upload complete confirmation.
10. View the **SUMMARY** field and ensure that the item is 'COMPLETED'.
11. De-activate the cursor.
12. Power down the system and remove the ChartView Enable card from PFD 1.

3.9.8 TAWS Enable

Follow this procedure to re-activate the TAWS Class B option. A TAWS Enable Card, as specified on General Arrangement Drawing, listed in Table 1-2, will be required for this procedure. Section 3.9.9 installs the Terrain/Obstacle database card.

NOTE

The G1000 has various features that require the use of unlock/enable cards to activate the feature. Throughout this document these cards are generically referred to as 'enable cards'. In some cases, the actual label on the physical card may say 'unlock'. If uncertain, the technician should verify the card part number prior to use.

NOTE

When the TAWS option is enabled for the first time (normally with the initial STC installation), the G1000 writes its unique system ID to the physical card and locks the files to this unique ID. This prevents the enable card from ever being used to activate TAWS in another G1000 system. This enable card is tied to the specific aircraft in which it was used for the first time. For situations where TAWS must be re-activated, this card must be used.

1. If not applied, apply power to the G1000 system.
2. Remove power from PFD 1, PFD 2 and MFD by opening the PFD 1 PRI/SEC, PFD 2 and MFD circuit breakers.
3. Insert the TAWS Class B Enable card in the upper slot of PFD 1.
4. While holding the **ENT** key on the PFD 1, PFD 2 and MFD (for MFD press and hold the farthest right pushbutton), restore power to the displays.
5. When the words INITIALIZING SYSTEM appear in the upper left corner of the displays, release the **ENT** key.
6. On PFD 1, go to the System Upload page using the small PFD 1 FMS knob.
7. Activate the cursor. Use the small PFD 1 FMS knob to select **CONFIGURATION FILES** in the AIRFRAME field and press the PFD 1 **ENT** key.
8. Highlight the **FILE** field. Use the PFD 1 small FMS knob to select the '**Enable TAWS**' option and press the PFD 1 **ENT** key. Once the option is selected, the configuration files in the PRODUCT field will be displayed. All files should be checked. If not, press the **CHK ALL** softkey.
9. Press the **LOAD** softkey.
10. Monitor the status of the upload. When the upload is finished, press the PFD 1 **ENT** key to acknowledge the upload complete confirmation.
11. View the **SUMMARY** field and ensure that the item is 'COMPLETE'.
12. De-activate the cursor.
13. Power down the system and remove the TAWS Enable card from PFD 1.

3.9.9 Terrain/Obstacle Database Cards

NOTE

If the G1000 is to be equipped with the FliteCharts or ChartView display options, the appropriate databases are required to be loaded onto the Terrain/Obstacle cards before they are installed in the displays. ChartView database subscription services must be procured directly from Jeppesen and are usually sourced by the aircraft owner. Further, the ChartView feature must be 'enabled' before the G1000 can use the databases (see Section 3.9.7).

There is no enable card for Garmin FliteCharts. A single cycle of Garmin FliteCharts is loaded on the database cards when they are manufactured at Garmin. Additional FliteCharts database updates are obtained directly from Garmin's web site and are updated on a periodic basis. The G1000 automatically detects the FliteCharts databases and activates the display feature. If the G1000 detects a ChartView database and a FliteCharts database, it will always activate the ChartView database.

1. Open PFD 1 PRI, PFD 1 SEC, PFD 2 and MFD circuit breakers.
2. Insert the current Terrain/Obstacle database cards into the lower slots of PFD 1, PFD 2, and the MFD. Refer to the General Arrangement drawing (listed in Table 1-2) for correct card part numbers.
3. Close the PFD 1 PRI, PFD 1 SEC, PFD 2 and MFD circuit breakers.

3.9.10 Aviation Database Loading & Update

1. Open PFD 1 PRI, PFD 1 SEC, PFD 2 and MFD circuit breakers.
2. Insert a database card containing the Jeppesen aviation database (database supplied by Jeppesen) into the top slot of PFD 2.
3. Apply power to PFD 2. The following prompt is displayed in the upper left corner of the PFD:

```
DO YOU WANT TO UPDATE THE AVIATION DATABASE?
PRESS CLR FOR NO AND ENT FOR YES
YOU HAVE 30 SECONDS BEFORE NO IS RETURNED
```

4. Press the PFD 2 ENT key to confirm the database update. The following prompt is displayed:

```
DO YOU WANT TO UPDATE THE AVIATION DATABASE?
PRESS CLR FOR NO AND ENT FOR YES
YOU HAVE 30 SECONDS BEFORE NO IS RETURNED
UPDATING AVIATION DATABASE
.
UPDATED 1 FILES SUCCESSFULLY!
```

5. After the update completes, PFD 2 starts in normal mode. Remove the aviation database update card from PFD 2.
6. Repeat steps 2 through 4 for the MFD (for MFD, press and hold the farthest right push button). Repeat again for PFD 1. The aviation databases are now updated.
7. Confirm that the correct update cycle and version is loaded at the power-up page of the MFD.
8. Remove the aviation database update card from PFD 1.

3.9.11 SVS/Pathways Enable

Follow this procedure to enable the Synthetic Vision option. An SVS/Pathways Enable Card, as specified on General Arrangement Drawing 005-00375-22, will be required for this procedure.

NOTE

The Garmin Synthetic Vision and Pathways feature requires 9 arc-second high resolution terrain databases to function. Each G1000 display must be equipped with the Terrain/Obstacle/SafeTaxi database card installed in the lower slot.

NOTE

When the SVS/Pathways option is enabled for the first time the G1000 writes its unique system ID to the physical card and locks the files to this unique ID. This prevents the SVS/Pathways unlock card from ever being used to activate the SVS/Pathway feature in other G1000 systems.

The unlock card is tied to the specific aircraft in which it was used for the first time. This card MUST be kept with the aircraft for situations where SVS/Pathways must be re-activated.

1. If not applied, apply power to the G1000 system.
2. Remove power from PFD1, PFD2 and MFD by opening the PFD1 PRI/SEC, PFD2 and MFD circuit breakers.
3. Insert the SVS Enable card in the upper slot of PFD1.
4. While holding the **ENT** key on the PFD1, PFD2 and MFD (for MFD press and hold the farthest right pushbutton), restore power to the displays.
5. When the words INITIALIZING SYSTEM appear in the upper left corner of the displays, release the **ENT** key.
6. On PFD1, go to the System Upload page using the small PFD1 FMS knob.
7. Activate the cursor. Use the small PFD1 FMS knob to select **CONFIGURATION FILES** in the AIRFRAME field and press the PFD1 **ENT** key.
8. Highlight the **FILE** field. Use the PFD1 small FMS knob to select the '**Enable SVS**' option and press the PFD1 **ENT** key. Once the option is selected, the configuration files in the PRODUCT field will be displayed. All files should be checked. If not, press the **CHK ALL** softkey.
9. Press the **LOAD** softkey.
10. Monitor the status of the upload. When the upload is finished, press the PFD1 **ENT** key to acknowledge the upload complete confirmation.
11. View the **SUMMARY** field and ensure that the item is 'COMPLETE'.
12. De-activate the cursor.
13. Power down the system and remove the Enable card from PFD1.

3.10 Aircraft Registration Number Entry

If not applied, apply power to the G1000 system.

1. With PFD1 in configuration mode, select the GTX page group, then select the **TRANSPONDER CONFIGURATION** page on PFD1.
2. Select or verify selected, **XPDR1** is in the SELECT TRANSPONDER window.
3. Ensure that the '**ADDRESS TYPE'** is '**US TAIL**' under the '**SET'** and '**ACTIVE'** columns.
4. Activate the cursor and highlight the '**ADDRESS'** field. Use the small/large FMS knobs to enter the aircraft registration number.

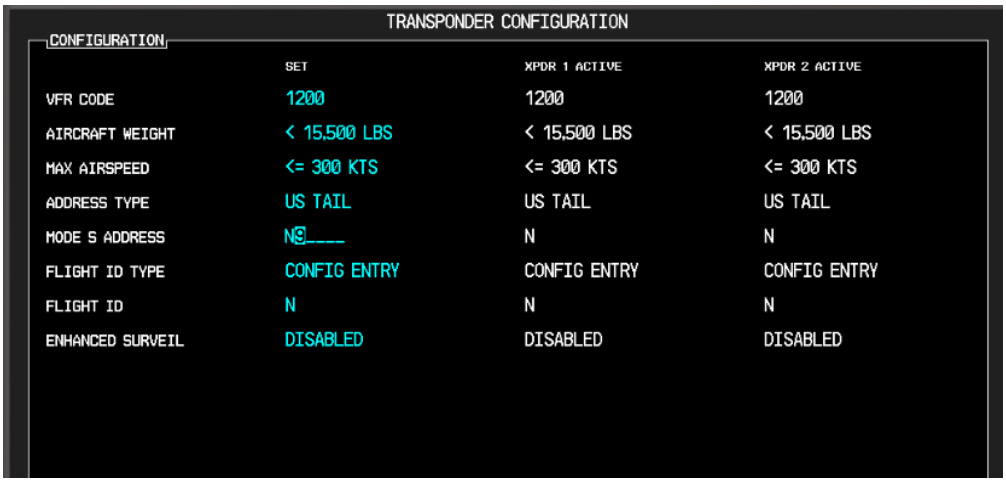


Figure 3-20. Aircraft Registration

5. Once the correct registration number is entered, press the ENT key. The transponders are configured.
6. Press the ENT key on PFD1 to acknowledge prompt.
7. Verify FLIGHT ID TYPE = SAME AS TAIL under SET and ACTIVE columns.
8. After completing transponder configuration, deactivate the cursor.

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4 Instructions for Continued Airworthiness

4.1 Airworthiness Limitations

The G1000 integrated cockpit is airworthy when installed, configured, and maintained in accordance with this section.

The G1000 and GFC 700 systems possess the following maintenance airworthiness limitations: The intervals for the airworthiness limitations are shown in maximum number of hours between checks, as required for certification. Table 4-1 aligns these requirements with the King Air Phase Inspection Program. These limitations were derived from the C90A System Safety Assessment 005-00375-17.

GFC 700 Limitations:

- Every 220 hours, perform a check to verify that flaps-in-motion discrete inputs function correctly. Refer to Table 4-1.
- Every 420 hours, perform a GSM 85A slip clutch check and servo current display check to verify proper operation. Refer to Table 4-1.
- Every 220 hours, perform a trim annunciator check to verify proper operation. Refer to Table 4-1.

G1000 Limitations:

- Every 220 hours, perform a G1000 redundant connections check. Refer to Table 4-1.
- Every 220 hours, perform a G1000 cooling system electrical check. Refer to Table 4-1.
- Every 820 hours, perform a nose avionics compartment fans operational check. Refer to Table 4-1.
- Every 820 hours, perform an instrument panel fans operational check. Refer to Table 4-1.
- Every 820 hours, perform a check to verify that engine data is available and accurate from GIA 1 or GIA 2. Refer to Table 4-1.
- Every 820 hours, perform a G1000 miscompare check. Refer to Table 4-1.

Other Limitations:

- Every 220 hours, check for proper function of the internal lighting of the standby attitude indicator (Mid-Continent P/N 4200-10), standby altimeter (Thommen P/N 3A43.22.35F.28.1.FU) and standby airspeed indicator (Thommen P/N 5A58.22.26K.28.1) as well as the proper power availability to the standby attitude indicator and standby altimeter vibrator by performing the Standby Instrument Electrical Power Checks. Refer to Table 4-1.
- Every 200 hours or 6 Calendar Months (whichever occurs first), perform an Emergency Battery Check of the L-3 PS-835(C or D Model) Emergency Battery. Refer to Table 4-1.

There are no other maintenance airworthiness limitations associated with this type design change (STC #SA01456WI-D). The G1000/GFC 700 King Air C90A/C90GT Airplane Flight Manual Supplement defines all operating limitations for this STC.

The Airworthiness Limitations section is FAA-approved and specifies maintenance required under §§ 43.16 and 91.403 of Title 14 of the Code of Federal Regulations, unless an alternative program has been FAA-approved.

FAA APPROVED

Robert Murray
ODA STC Unit Administrator
ODA-240087-CE

5/18/2010
Date

4.2 Servicing Information

G1000 LRU maintenance is 'on condition' only. No component-level overhaul is required for this type design change.

4.2.1 On Condition Servicing

'On Condition' replacement and/or servicing should occur when an item exhibits conditions, symptoms, and/or abnormalities defined in Section 5 of this manual. Replacement and/or servicing should be made only after the technician troubleshoots the system to the extent determined necessary by using the guidance in this manual along with common avionics maintenance practices.

IMPORTANT!

It is impossible to provide guidance for every conceivable failure scenario within the scope of this manual. Every effort has been made to provide comprehensive guidance for possible failures. The information in this document should always be combined with common sense and a thorough knowledge of the system. Use sound avionics maintenance practices when working around or on G1000 equipment.

The remainder of this document is organized in the following fashion:

- Section 4.3 lists maintenance requirements related to the G1000 system.
- Section 6 gives instructions regarding the removal and replacement of physical G1000 equipment and parts.
- Section 7 gives configuration and testing instructions to be accomplished if G1000 equipment or parts are removed or replaced.
- Section 8 specifies system return-to-service procedures.

The beginning of Section 6 provides instructions to check the software part number and version of each LRU before removing a unit. Procedures in Section 7 require the same check after LRU replacement and software loading.

IMPORTANT!

All structural repairs associated with this installation are to be addressed in accordance with the Hawker Beechcraft Structural Inspection and Repair Manual listed in Table 1-3.

4.2.2 Required Tools

The following tools are needed to perform maintenance tasks on G1000 equipment:

- Calibrated Milli-ohm meter, OR
  - ✓ Agilent 34410A Ammeter or equivalent
  - ✓ Fluke 187 Voltmeter or equivalent
  - ✓ Power Supply capable of providing 1 amp current
- #2 Non-Magnetic Phillips Screwdriver
- 3/32” Hex tool
- Calibrated digital level (Required for AHRS ‘Procedure A’ Calibration)
- Calibrated VHF NAV/COM/ILS ramp tester or equivalent
- Calibrated transponder ramp tester or equivalent
- Calibrated pitot/static ramp tester
- Outdoor line-of-site to GPS satellite signals or GPS indoor repeater
- Headset/microphone
- Ground Power Unit (Capable of supplying 28 Vdc)
- Calibrated Flight Control Cable Tension Meter or equivalent
- Servo Mount Slip Clutch Adjustment Tool – Garmin P/N T10-00110-01 and a 2 Amp, 24 V, DC Power Supply
- Calibrated torque wrench capable of measuring 0 – 70 in/lbs
- Standard sockets & wrenches (3/8”, 9/16”, and 13/16”)
- Calibrated digital thermometer suitable for measuring ambient temperature
- Laptop with RS232 emulation software
- M22885/108T8234 extraction tool
- An 0.060” 6-Spline wrench
- WX-PA portable analyzer kit (If Stormscope is installed)

4.3 Maintenance Intervals

Table 4-1 shows systems and items, installed by this STC, which must undergo tests or checks at specific intervals. If the interval is shown to be in flight time as well as calendar months, the first interval reached should be used as the limit.

The inspection time tables used are aligned with the existing maintenance phase intervals used in the current King Air Model 90 Series Maintenance Manual. A complete inspection cycle for the King Air C90 is 800 hours or 24 calendar months, divided into the following four phases:

- **Inspection Phase 1**: To be performed at 200 hours and every 800 hours thereafter.
- **Inspection Phase 2**: To be performed at 400 hours and every 800 hours thereafter.
- **Inspection Phase 3**: To be performed at 600 hours and every 800 hours thereafter.
- **Inspection Phase 4**: To be performed at 800 hours and every 800 hours thereafter.

Those inspections that are based on flight time, calendar elapsed time or cycles shall have specific intervals stated in Table 4-1.

IMPORTANT!

As allowed in the King Air Model 90 Series Maintenance Manual, a tolerance of +/- 20 hours for all phase inspections. For tolerances on calendar months, refer to the King Air Model 90 Series Maintenance Manual listed in Table 1-2.

The intention of Garmin is to align this maintenance program as best possible with the existing King Air C90 inspection program. For a complete description of the King Air inspection program, refer to the King Air Model 90 Series Maintenance Manual listed in Table 1-2.

Table 4-1. Maintenance Intervals

Item	Description/Procedure	Manual Section No.	Interval
G1000/GFC700 Equipment			
G1000/GFC700 System Visual Inspections	Complete Visual Inspection of GWX 68 Equipment and Wiring located in Nose Section	4.4	Phase 4
	Complete Visual Inspection of G1000/GFC700 Equipment and Wiring located in Nose Avionics Compartment	4.4	Phase 4
	Complete Visual Inspection of G1000/GFC700 Equipment and Wiring located in Pilot's Compartment	4.4	Phase 3
	Complete Visual Inspection of G1000/GFC700 Equipment and Wiring located on and behind Instrument Panel	4.4	Phase 3
	Complete Visual Inspection of G1000/GFC700 Equipment and Wiring located in Cabin	4.4	Phase 3
	Complete Visual Inspection of G1000/GFC700 Equipment and Wiring located in Rear Fuselage and Empennage	4.4	Phase 4

Item	Description/Procedure	Manual Section No.	Interval
GFC700 Periodic Check	Verify proper operation of the GFC700 by performing the following: Pre-Flight Test AFCS Switch Checks Autopilot Operation Checks	8.2.1, 8.2.2, 8.2.5	Phase 2 and 4
TAWS Functional Check	Periodic TAWS function check	7.15	Phase 4
GDU 1040A PFD (Qty 2)	Removal & Replacement	6.1	On Condition
GDU 1500 MFD	Removal & Replacement	6.1	On Condition
GMA 1347D (Qty 2)	Removal & Replacement	6.2	On Condition
	GMA 1347D Test	7.2.1	Phase 2 and 4
	Landing Gear Aural Alert and XM Audio Suppression Test	7.2.2	Phase 2 and 4
	XM Audio Suppression Check	7.2.3 or 7.2.4	Phase 2 and 4
GIA 63W IAU (Qty 2)	Removal & Replacement	6.3	On Condition
GEA 71 EAU (Qty 2)		6.4	
GTX 33 Transponder (Qty 2)	Removal & Replacement	6.5	On Condition
	Test according to Title 14 CFR §§ 91.411 and 91.413 as well as Part 43 Appendix F.	7.5	24 Calendar Months
GDC 74B (Qty 2)	Removal & Replacement	6.6	On Condition
	Test according to Title 14 CFR § 91.411 and Part 43 Appendix E.	7.6	24 Calendar Months
GRS 77 AHRS (Qty 2)	Removal & Replacement	6.8	On Condition
	Magnetic variation database update.	4.6	
GMU 44 Magnetometer (Qty 2)	Removal & Replacement	6.9	
GDL 69A		6.10	
GWX 68		6.15	
GMC 710		6.14	
GCU 475		6.13	
G1000 Cooling System Electrical Check*	**Verify the operation of the fan power and fan speed monitoring circuits for GIA1 Fan, GIA2 fan, PFD1 fan, MFD fan and PFD2 fan and fan fail messages**	**8.1.4**	**Phase 1, 2, 3 & 4**
Nose Avionics Compartment Fans Operational Check*	**Functional test of the GIA1 and GIA2 ported fans. Verify airflow from all fan ports**	**4.14**	**Phase 4**
Instrument Panel Fans Operational Check*	**Functional test of the PFD1, MFD and PFD2 cooling fans. Verify airflow from each fan**	**4.15**	**Phase 3**

*** Denotes Airworthiness Limitation Maintenance Requirement (See Section 4.1)**

Item	Description/Procedure	Manual Section No.	Interval
G1000 Redundant Connection Check*	**Verify PRI and SEC power sources for PFD 1, GIA 1, GRS 1, GDC 1** **Verify secondary paths for AHRS, ADC, engine parameters and GPS data** **Verify the operation of PFD and MFD Ethernet connections** **Verify ARINC connection between ADC1 and MFD and between GRS1 and MFD** **Verify DISPLAY BACKUP button function**	**4.10**	**Phase 1, 2, 3 & 4**
Engine Data Check (GIA 1 or 2 Inoperative)*	**Verify engine data is available and accurate with GIA 1 or GIA 2 inoperative**	**4.11**	**Phase 4**
Trim Annunciator Check*	**Verify trim annunciators function properly**	**4.12**	**Phase 1, 2, 3 & 4**
G1000 Miscompare Check*	**Verify AHRS, airspeed and altitude miscompare monitors function properly**	**4.13**	**Phase 4**
G1000 Alerts	Check for and troubleshoot any alerts provided in the alert window per the referenced manual section	5	On Condition
GPS/WAAS Antennas	Removal & Replacement Refer to Master Drawing List, listed in Table 1-2, for installation drawings.	6.18	On Condition
Flaps-in-motion Discrete Input Check*	**Test the Flaps-in-motion discrete inputs to the G1000 to verify proper operation.**	**4.8**	**Phase 1, 2, 3 & 4**
GSA 81 and GSA 80 Servos (all)	Removal & Replacement. Refer to the servo install drawings listed in Master Drawing List, listed in Table 1-2.	6.11	On Condition
	Clean and apply grease to output gears.	4.7	Phase 4
GSM 85A Servo Mounts (all)	Removal & Replacement. Refer to the servo install drawings listed in Master Drawing List, listed in Table 1-2.	6.12	On Condition
GSM 85A Servo Mount Slip Clutch Torque Check and Servo Current Display Check*	**Automated test to verify that the pitch, roll, yaw and pitch trim GSM 85A slip clutches are within acceptable limits and verification of servo load cell integrity by monitoring servo current at each axis during the automated slip clutch test**	**4.9**	**Phase 2 & 4**
Low Speed Awareness Band*	**Verify the integrity of the wiring interface between the right landing gear safety switch assembly and the No. 1 and No. 2 GIA inputs.**	**7.21.5**	**Phase 1, 2, 3 & 4**
G1000 Accessories			
Configuration Module Replacement (Qty 7)	Removal & Replacement.	6.16	On Condition
GEA 71 Backshell Thermocouple (Qty 2)	Removal & Replacement.	6.17	

* **Denotes Airworthiness Limitation Maintenance Requirement (See Section 4.1)**

Item	Description/Procedure	Manual Section No.	Interval
GTP 59 OAT Probe (Qty 2)	Removal & Replacement.	6.7	
PFD, MFD, and GIA Cooling Fans (Qty 5)	Removal & Replacement Refer to Master Drawing List, listed in Table 1-2, for installation drawings.	N/A	
G1000 Lightning Protection			
Electrical Bonding Test	Perform the Phase 3 electrical bonding resistance check of G1000 equipment	4.5.3	Phase 3
	Perform the Phase 4 electrical bonding resistance check of G1000 equipment	4.5.4	Phase 4
Engine/Airframe Sensors			
ITT Thermocouple Cable (Qty 2)	Removal & Replacement: Refer to King Air Model 90 Series Maintenance Manual listed in Table 1-2.	N/A	On Condition
Oil Pressure Sensor (Qty 2)			
Oil Temperature Sensor (Qty 2)			
Torque Transmitter (Qty 2)			
Fuel Flow Transmitter (Qty 2)	Removal & Replacement: Refer to King Air Model 90 Series Maintenance Manual listed in Table 1-2.	N/A	On Condition
Prop Tachometer (Qty 2)			
Engine Speed Tachometer (Qty 2)			
Engine Signal Conditioners (Qty 2)	Removal & Replacement	6.19	
Aerospace Optics Annunciator – Prop Sync		6.21	
PC920 Conditioner (if added by this STC)		6.20	
Other Equipment			
Thommen Airspeed Indicator - Standby	Removal & Replacement	6.23	On Condition
Thommen Altimeter – Standby		6.24	
Mid-Continent Attitude Indicator – Standby		6.25	
L-3 PS-835(C or D Emergency Battery	Removal & Replacement	6.22	On Condition
	Capacity test of standby battery Refer to Chapter 24 of the King Air Series Component Maintenance Manual listed in Table 1-2.	N/A	12 Calendar Months

Item	Description/Procedure	Manual Section No.	Interval
Emergency Battery Check*	**Verify the emergency battery is being charged** Refer to Chapter 24 of the King Air Series Component Maintenance Manual listed in Table 1-2.	**N/A**	**200 Hours or 6 Calendar Months**
Standby Instrument Electrical Power Checks*	**Verify STBY ATT & STBY ALT vibrator operate and STBY ATT, STBY ALT & STBY A/S illumination function on either aircraft power or standby battery power** **(standby compass checked during existing maintenance)**	**8.1.5**	**Phase 1, 2, 3 & 4**
Aerospace Optics Annunciator – Standby Battery	Removal & Replacement	6.21	On Condition
Northern Airborne Speaker Amplifier (if added by this STC)	Removal & Replacement: Refer to King Air Model 90 Series Maintenance Manual listed in Table 1-2.	N/A	

4.3.1 Discontinued Maintenance

Table 4-2 shows a list of inspections and tests that are listed in the King Air Model 90 Series Maintenance Manual, but may be no longer required post incorporation of this STC. It is the responsibility of the installer to ensure that there are no post factory installations that would require these checks to remain.

Table 4-2. Discontinued Maintenance Intervals

Item	Description/Procedure	Manual	Interval
AC Inverter	Operational Check	Phase Inspections	Phases 1 - 4
Engine Torque Indicating System**	Torque Indicator Re-calibration	CenTex STC SA10339SC	5,000 hours

**** Engine Torque Indicating System as installed by CenTex STC SA10339SC includes both an indicator and a transducer. The indicator is removed per this STC (SA01456WI-D); the transducer remains in the aircraft and the existing maintenance requirements for the transducer are still applicable.**

IMPORTANT!

For installed equipment not listed in this maintenance manual, use the inspection procedures set forth in Chapter 05 of the King Air Model 90 Series Maintenance Manual, or other appropriate maintenance manual, as the requirements set forth by those manuals are still applicable. The requirements set forth by this document take precedence over those set forth by the King Air Model 90 Series Maintenance Manual, or other appropriate maintenance manual, in cases where the requirements conflict.

* **Denotes Airworthiness Limitation Maintenance Requirement (See Section 4.1)**

4.4 Visual Inspection

Perform a visual inspection in accordance with requirements in Table 4-1. Check for corrosion, damage, or other defects for each of the items listed in Table 4-3 through Table 4-8. Replace any damaged parts as required. Inspection may require the temporary removal of a unit or units to gain access to connectors. Follow guidance in Section 6 for equipment removal and replacement. Refer to the King Air Model 90 Series Maintenance Manual listed in Table 1-2 for instructions on removing any access panels.

NOTE

It is recommended that the Phase 3 and Phase 4 electrical bonding checks contained in section 4.5 are conducted after the Phase 3 and 4 visual inspections while access to these zones is still open.

Table 4-3. Nose Section Visual Inspection Procedure

Item	Description/Procedure	Initials
Gain access via the Radome for the following Inspection:		
GWX 68	a) Inspect the GWX 68 unit, mount, and connectors for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment. b) Inspect wire harness for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Nose Wire Harness Routing drawing, listed in Table 1-2.	

Table 4-4. Nose Avionics Compartment Visual Inspection Procedure

Item	Description/Procedure	Initials
Gain access via the Nose Equipment Compartment access panel for the following Inspection:		
GRS 77 (Qty 2)	a) Inspect the GRS 77 units, racks, and connectors for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.	
GTX 33 (Qty 2)	a) Inspect the GTX 33 units, racks, and connectors for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.	
GIA 63W (Qty 2)	a) Inspect the GIA 63W units, racks, and connectors for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.	
GIA Avionics Fan (Qty 2)	a) Inspect remote avionics fans and hoses for dirt accumulation and other damage. Remove excess dirt as required.	
LMD Rack and Modules	a) Inspect the LMD rack, modules, and termination for corrosion or other defects.	
Nose Wiring Harness	a) Inspect bulkhead connectors for security of attachment, corrosion or other defects. b) Inspect wire and coax for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Nose Wire Harness Routing drawing, listed in Table 1-2. . Pay particular attention to possible areas of chaffing such as the middle shelf feed-through hole, wheel well protrusion etc. c) Inspect Ground blocks for security of attachment, corrosion or other defects. d) Ensure all connectors are securely fastened.	

Table 4-5. Pilot's Compartment Visual Inspection Procedure

Item	Description/Procedure	Initials
Locate equipment in the aft pedestal for the following inspection:		
GCU 475	a) Inspect the GCU 475 unit and connector for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.	
ADF CTL-62 (relocated by STC)	a) Inspect the CTL-62 unit and connector for corrosion or other defects. Check the integrity of the SHIELD ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment. Refer also to the King Air Model 90 Series Maintenance Manual, listed in Table 1-2.	
To gain access for the following Inspections, remove pilot and co-pilot seats and cockpit floor panels. NOTE: The tach-gen filter assemblies, GPN 005-00375-93, are installed underneath the pilot and co-pilot cockpit floor panels. Caution must be observed when removing floor panels so as not to damage tach-gen filter harnesses. A connector is installed in each tach-gen filter harness to allow the filter to be disconnected when removing the floor panel. (The Tach-gen filter assembly is applicable to installations with Sandia ST-26 Tach-Gen Adapter unit installed by STC SA01456WI-D MDL 005-00375-30, Revision 4 and previously approved revisions.)		
Pedestal Wiring	a) Inspect all visible wire harness for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Cabin Wire Harness Routing drawing, listed in Table 1-2.	
GTP 59 (Qty 2)	a) Inspect the GTP 59 units and connectors for corrosion or other defects. Check the integrity of the SHIELD ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment. b) Inspect wire harness for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Cabin Wire Harness Routing drawing, listed in Table 1-2	

Table 4-6. Instrument Panel G1000 Equipment Visual Inspection Procedure

Item	Description/Procedure	Initials
Gain access to behind the instrument panel by removing the PFDs and MFD. Gain access to circuit breaker panels by removing the screws which fasten then edgelit placards to the panels		
GDU 1040A PFD (Qty 2) & GDU 1500 MFD	a) Remove the MFD and PFDs as described in Section 6. b) Inspect the mounting surface, copper bonding fingers and connector for corrosion, heavy oxidation, or other damage. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment. c) Inspect the CTL-62 unit and connector for corrosion or other defects. Check the integrity of the SHIELD ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment. Refer also to the King Air Model 90 Series Maintenance Manual, listed in Table 1-2. d) Do not reinstall GDUs at this time. GDU cutouts provide access for visual inspections below.	
G1000 Wiring harness	a) Inspect all instrument panel wire harness for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Cabin Wire Harness Routing drawing, listed in Table 1-2. b) Inspect circuit breaker wiring for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96, the appropriate Circuit Breaker Panel Modification drawing, listed in Table 1-2, and the Cabin Wire Harness Routing drawing, listed in Table 1-2. c) Inspect all other exposed G1000 wiring for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Cabin Wire Harness Routing drawing, listed in Table 1-2. d) Inspect all fwd bulkhead connectors for security of attachment	
GDC 74B Air Data Computer (Qty 2)	a) Visually inspect each GDC 74B unit, mount, and connector for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment. b) Visually inspect the pitot/static plumbing and ensure it is secure and in good condition.	
GEA 71 Engine/ Airframe Unit (Qty 2)	a) Inspect the GEA 71 unit, rack, and connectors for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.	
GMA 1347D (Qty 2)	a) Inspect the GMA 1347D unit, rack and connectors for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.	
PFD and MFD Fans (Qty 3)	a) Inspect fans for accumulation of dirt and other damage. Remove excess dirt as required.	
GDL 69A	a) Inspect the GDL 69A unit, rack, and connectors for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.	
GMC 710	a) Inspect the GMC 710 unit, mount, and connectors for corrosion or other defects. Check the integrity of the SHIELD BLOCK ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.	
Senior Aerospace PC920 Signal Cond.	a) Inspect the PC920 unit, mount, and connectors for corrosion or other defects. NOTE: Applicable only to STC SA01456WI-D, MDL 005-00375-30, Revision 4 and previously approved revisions.	
Sandia Aerospace ST26 Adapter(Qty 2)	a) Inspect the ST26 unit, mount, and connectors for corrosion or other defects NOTE: Applicable only to STC SA01456WI-D, MDL Revision 4 and previously approved revisions.	

Item	Description/Procedure	Initials
VMI Signal Conditioner (Qty 2)	a) Inspect the signal conditioner unit, mount, and connectors for corrosion or other defects. NOTE: Applicable only to STC SA01456WI-D, MDL 005-00375-30, Revision 5 and subsequent approved revisions.	
Mid-Continent Standby Attitude Ind.	a) Inspect the standby attitude indicator unit and connector for corrosion or other defects.	
Thommen Standby Airspeed Ind.	a) Inspect the standby airspeed indicator unit and connector for corrosion or other defects. b) Visually inspect the plumbing and harness connector assembly, and ensure it is secure and in good condition.	
Thommen Standby Altimeter	a) Inspect the standby altimeter indicator unit and connector for corrosion or other defects. b) Visually inspect the plumbing and harness connector assembly, and ensure it is secure and in good condition.	
Circuit Breaker Panels	a) Inspect circuit breaker panel wiring and circuit breakers for chafing, damage, other defects and proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96, the appropriate Circuit Breaker Panel Modification drawing, listed in Table 1-2, and the Cabin Wire Harness Routing drawing, listed in Table 1-2. Pay particular attention to possible areas of chaffing. b) Inspect edgelit overlay panels for damage or defect. c) Reinstall the circuit breaker edgelit overlays to the circuit breaker panels.	
	a) Reinstall the MFD and PFDs as described in Section 6. b) Reinstall the circuit breaker edgelit placards to the circuit breaker panels.	

Table 4-7. Cabin Area Visual Inspection Procedure

Item	Description/Procedure	Initials
To gain access for the following Inspections, remove floorboard in cabin at FS 185.00		
Cabin Wiring Harness	a) Inspect all exposed wire harness for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Cabin Wire Harness Routing drawing, listed in Table 1-2.	
GFC 700 Equipment	a) Using a flashlight, inspect the servo, servo mount, connectors, support structures, and control cables to ensure that no corrosion, chaffing, cracks, or other defects exist. b) Have an assistant manually move the control surfaces from stop to stop and visually observe the servo, and control cabling/chain. Ensure there is no binding in the control cabling or chain, and that the capstan/sprocket rotates freely. c) Check the servo control cables in accordance with AC 43.13-1B, Chapter 7, Section 8, Paragraph 7-149 to ensure no fraying, corrosion, or other damage exists. If the condition of the cable is questionable, replace it with a new one. d) Check the tension on the control cables. Refer to the Roll Servo Install drawing, listed in Table 1-2, for cable tension specifications: e) Ensure that each cable is correctly attached to the clamps. f) Follow recommended checks for checking main control cables, following the instructions in Chapter 27, Flight Controls, of the King Air Model 90 Series Maintenance Manual. g) Replace the access panels if no other maintenance is to be performed.	

Table 4-8. Rear Fuselage and Empennage Visual Inspection Procedure

Item	Description/Procedure	Initials
To gain access for the following Inspections, refer to the servo installation drawings and the King Air Model 90 Series Maintenance Manual, listed in Table 1-2.		
Tail Wiring Harness	a) Inspect all exposed wire harness for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Tail Wire Harness Routing drawing, listed in Table 1-2. b) Verify security of aft bulkhead connectors	
GFC 700 Equipment	a) Using a flashlight, inspect the servos, servo mounts, connectors, support structures, and control cables to ensure that no corrosion, chaffing, cracks, or other defects exist. b) Have an assistant manually move the control surfaces and elevator trim wheel from stop to stop and visually observe the corresponding servo and control cabling/chain. Ensure there is no binding in the control cabling or chain, and that the capstan/sprocket rotates freely. c) Check the servo control cables in accordance with AC 43.13-1B, Chapter 7, Section 8, Paragraph 7-149 to ensure no fraying, corrosion, or other damage exists. If the condition of the cable is questionable, replace it with a new one. d) Check the tension on the control cables. Refer to the respective servo installation drawing listed in Table 1-2 for cable tension specifications e) Ensure that each cable is correctly attached to the clamps. f) Follow recommended checks for checking main control cables, following the instructions in Chapter 27, Flight Controls, of the King Air Model 90 Series Maintenance Manual, listed in Table 1-2. g) Replace the access panels if no other maintenance is to be performed.	
The GMU 44 units are mounted in the vertical tail. To gain access, remove service panel in tail. Refer to King Air Model 90 Series Maintenance Manual, listed in Table 1-2, for removal instructions.		
GMU 44 (Qty 2)	a) For each GMU 44, do the following: b) Remove the three Phillips screws holding the GMU access plate to the mounting bracket. Be sure to use a non-magnetic screwdriver to avoid harming the GMU. c) Carefully lower the assembly and inspect the GMU 44 and mounting plate. d) Inspect the mounting hardware and GMU 44 for corrosion or other damage. e) Inspect the GMU wiring and ensure no chaffing, wear, or other damage exists in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96 and the Tail Wire Harness Routing drawing, listed in Table 1-2. Pay particular attention to possible areas of chaffing. f) Reinstall the GMU 44.	

IMPORTANT!

For installed equipment not listed in this maintenance manual, use the inspection procedures set forth in Chapter 05 of the King Air Model 90 Series Maintenance Manual, or other appropriate maintenance manual, as the requirements set forth by those manuals are still applicable. The requirements set forth by this document take precedence over those set forth by the King Air Model 90 Series Maintenance Manual, or other appropriate maintenance manual, in cases where the requirements conflict.

4.5 Electrical Bonding Test

The following bonding test is provided for G1000-equipped C90A/C90GT King Air aircraft as a requirement beyond what is given in the aircraft maintenance manual. The electrical bonding checks are split into two tests, Phase 3 Electrical Bonding Test and Phase 4 Electrical bonding test. This places the bonding test requirement for each G1000 LRU in the same phase as the visual inspection of that zone to minimize access requirements.

4.5.1 Requirements

All G1000 equipment must be installed. Gain access for the procedure listed below in Section 4.5.3 as required and in accordance with the King Air Model 90 Series Maintenance Manual. It is recommended that these tests are conducted after visual inspection of the zone to minimize access requirements.

4.5.2 Test Equipment

A milli-ohm meter and Kelvin probes are recommended for this test. However, a standard voltmeter, power supply with adjustable current limit, and ammeter may be substituted. The following procedure is written using the voltmeter, power supply and ammeter. All test equipment must have valid calibration records.

4.5.3 Phase 3 Electrical Bonding Procedure

1. Connect the positive lead of the power supply to the engine compartment grounding bracket (battery negative connection to the airframe). Connect/touch the positive lead of the voltmeter to the same point.

NOTE

Ensure that the voltmeter and power supply probes do not touch, so as not to induce contact resistance.

2. Touch negative lead of power supply to each of the test points listed while performing Step 3. At each point, configure the power supply to produce 1 amp before measuring voltage. (Use an ammeter to ensure current is within 1 amp ±100 milli-amp at each point).
3. Set the voltmeter to measure milli-volts and null the reading. Measure the voltage from the engine grounding bracket (step 1) to each of the following points and record the voltage. (Perform Step 2 at each point to ensure that 1 amp ±100 milli-amp is present before measuring)

Pilot Compartment

- Top metal case of PFD 1: _____ milli-volts
- Top metal case of PFD 2: _____ milli-volts
- Top metal case of MFD: _____ milli-volts
- Top metal case of GMA 1347D #1: _____ milli-volts
- Top metal case of GMA 1347D #2: _____ milli-volts
- Top metal case of GCU 475: _____ milli-volts
- Top metal case of GMC 710: _____ milli-volts
- GEA 71 #1 body: _____ milli-volts
- GEA 71 #2 body: _____ milli-volts
- GDC 74B #1 body: _____ milli-volts
- GDC 74B #2 body: _____ milli-volts
- OAT 1 Probe base nut (inside fuselage): _____ milli-volts
- OAT 2 Probe base nut (inside fuselage): _____ milli-volts
- GDL 69A body: _____ milli-volts
- Engine Signal Conditioner #1 near mounting holes of case: _____ milli-volts
- Engine Signal Conditioner #2 near mounting holes of case: _____ milli-volts
- PC920 Fuel Flow Signal Conditioner (if installed) near mounting holes of case: _____ milli-volts
- PFD1 Cooling fan metal base: _____ milli-volts
- PFD2 Cooling fan metal base: _____ milli-volts
- MFD Cooling fan metal base: _____ milli-volts

Cabin Compartment

- GSA 80 (Roll) Servo body: _____ milli-volts

Ensure that at each PFD or MFD test point, no more than 20 milli-volts (20 mΩ) are present. Ensure that at each other test point, no more than 2.5 milli-volts (2.5 mΩ) are present. In this case, voltage is equivalent to resistance (Ω), given that precisely 1 amp reference current is present.

TIP: If 1 amp reference current cannot be maintained, note the difference between the attainable current and 1 amp reference current. Calculate the percentage difference and apply this to the voltage reading to obtain the equivalent resistance. Example: If the measured current is 1.2 amps, (20% high from the target 1 amp current), then the allowable voltage measurement would be 20% high, 2.5 milli-volts would now be 3.0 milli-volts.

4.5.4 Phase 4 Electrical Bonding Procedure

1. Connect the positive lead of the power supply to the engine compartment grounding bracket (battery negative connection to the airframe). Connect/touch the positive lead of the voltmeter to the same point.

NOTE

Ensure that the voltmeter and power supply probes do not touch, so as not to induce contact resistance.

2. Touch negative lead of power supply to each of the test points listed while performing Step 3. At each point, configure the power supply to produce 1 amp before measuring voltage. (Use an ammeter to ensure current is within 1 amp ±100 milli-amp at each point).
3. Set the voltmeter to measure milli-volts and null the reading. Measure the voltage from the engine grounding bracket (step 1) to each of the following points and record the voltage. (Perform Step 2 at each point to ensure that 1 amp ±100 milli-amp is present before measuring)

Nose Section

- GWX 68 body: _____ milli-volts

Nose Avionics Compartment

- GIA 1 top: _____ milli-volts
- GIA 2 top: _____ milli-volts
- GTX 33 #1 top: _____ milli-volts
- GTX 33 #2 top: _____ milli-volts
- GRS 77 #1 metal base: _____ milli-volts
- GRS 77 #2 metal base: _____ milli-volts
- Standby battery: _____ milli-volts (may be installed in rear fuselage)

Rear Fuselage and Empennage

- GMU 44 #1 metal base: _____ milli-volts
- GMU 44 #2 metal base: _____ milli-volts
- GSA 80 (Pitch) Servo body: _____ milli-volts
- GSA 81 (Pitch Trim) Servo body: _____ milli-volts
- GSA 80 (Yaw) Servo body: _____ milli-volts

TIP: If 1 amp reference current cannot be maintained, note the difference between the attainable current and 1 amp reference current. Calculate the percentage difference and apply this to the voltage reading to obtain the equivalent resistance. Example: If the measured current is 1.2 amps, (20% high from the target 1 amp current), then the allowable voltage measurement would be 20% high, 2.5 milli-volts would now be 3.0 milli-volts.

4.6 GRS 77 Earth Magnetic Field Updates

The GRS 77 utilizes an Earth magnetic field model which is updated once every five years. The update is expected to be available from Garmin in each of the following years: 2010, 2015, and every five years thereafter, as long as the GRS 77 remains a Garmin-supported product.

The G1000 system alerts the operator that the magnetic field database is out of date by issuing the message "AHRS SERVICE – AHRS Magnetic-field model needs update" (Ref. Section 5.133.2). Garmin will distribute update instructions when updates are available. As of this writing, Garmin Service Bulletin #0533 addresses the most recent update to the 2005 database. Service Bulletins may be obtained from www.garmin.com at the 'Dealers Only' portion of the web site.

4.7 GSA 8X Greasing Procedure

Re-grease each servo output gear following this procedure.

1. Remove each servo as per Section 6.11.
2. Using a lint-free cloth, remove excess grease build-up from the single servo output gear (see Figure 4-1.)

   IMPORTANT!

   It is not necessary to remove all of the grease from the output gear, only the excess grease. DO NOT USE SOLVENTS TO CLEAN THE OUTPUT GEAR!

3. Using a brush or other applicator, apply a thin coat of Aeroshell 33MS (Lithium-complex based) grease to the servo output gear.
4. Reinstall each servo as per Section 6.11.

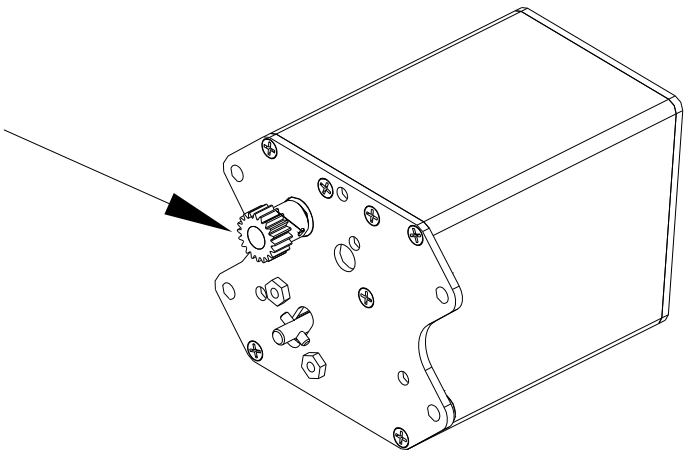
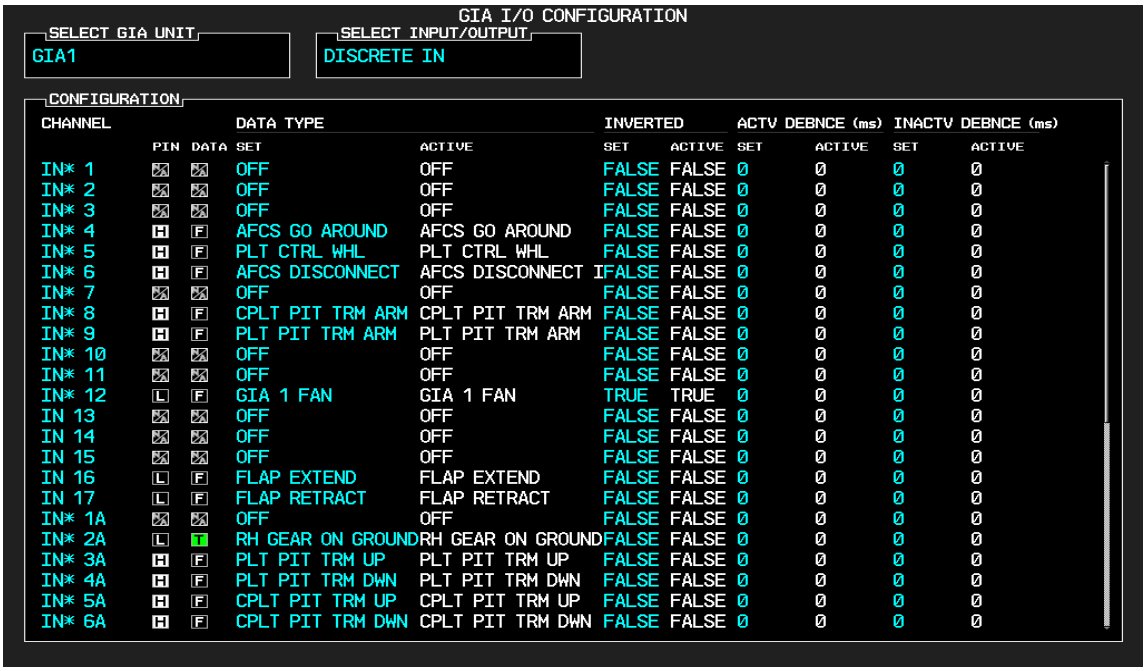


Figure 4-1. Servo Gear

4.8 Flaps-in-Motion Discrete Input Check

To perform this check, all G1000 and GFC 700 equipment must be installed and operational. Start the G1000 system in Configuration Mode and go to the GIA Page Group and select the GIA I/O Configuration Page using the FMS knob. Perform the following checks:



CHANNEL	PIN	DATA	DATA TYPE SET	DATA TYPE ACTIVE	INVERTED SET	INVERTED ACTIVE	ACTV DEBNCE (ms) SET	ACTV DEBNCE (ms) ACTIVE	INACTV DEBNCE (ms) SET	INACTV DEBNCE (ms) ACTIVE
IN* 1			OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 2			OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 3			OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 4	H	F	AFCS GO AROUND	AFCS GO AROUND	FALSE	FALSE	0	0	0	0
IN* 5	H	F	PLT CTRL WHL	PLT CTRL WHL	FALSE	FALSE	0	0	0	0
IN* 6	H	F	AFCS DISCONNECT	AFCS DISCONNECT I	FALSE	FALSE	0	0	0	0
IN* 7			OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 8	H	F	CPLT PIT TRM ARM	CPLT PIT TRM ARM	FALSE	FALSE	0	0	0	0
IN* 9	H	F	PLT PIT TRM ARM	PLT PIT TRM ARM	FALSE	FALSE	0	0	0	0
IN* 10			OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 11			OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 12	L	F	GIA 1 FAN	GIA 1 FAN	TRUE	TRUE	0	0	0	0
IN 13			OFF	OFF	FALSE	FALSE	0	0	0	0
IN 14			OFF	OFF	FALSE	FALSE	0	0	0	0
IN 15			OFF	OFF	FALSE	FALSE	0	0	0	0
IN 16	L	F	FLAP EXTEND	FLAP EXTEND	FALSE	FALSE	0	0	0	0
IN 17	L	F	FLAP RETRACT	FLAP RETRACT	FALSE	FALSE	0	0	0	0
IN* 1A			OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 2A	L	T	RH GEAR ON GROUND	RH GEAR ON GROUND	FALSE	FALSE	0	0	0	0
IN* 3A	H	F	PLT PIT TRM UP	PLT PIT TRM UP	FALSE	FALSE	0	0	0	0
IN* 4A	H	F	PLT PIT TRM DWN	PLT PIT TRM DWN	FALSE	FALSE	0	0	0	0
IN* 5A	H	F	CPLT PIT TRM UP	CPLT PIT TRM UP	FALSE	FALSE	0	0	0	0
IN* 6A	H	F	CPLT PIT TRM DWN	CPLT PIT TRM DWN	FALSE	FALSE	0	0	0	0

Figure 4-2. GIA I/O Page

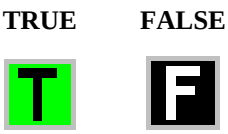


Figure 4-3. Discrete True/False Indications

NOTE

Reference Table 3-1 for interpretation of data indicator symbols

1. Verify the DATA indicators of the discrete inputs labeled ‘FLAP EXTEND’ and ‘FLAP RETRACT’ show a FALSE condition.
2. Extend the flaps down. While the flaps are traveling down, check that the DATA indicator of the discrete input labeled ‘FLAP EXTEND’ changes to a TRUE condition.
3. When the flap motion is completed, verify the DATA indicators of the discrete inputs labeled ‘FLAP EXTEND’ and ‘FLAP RETRACT’ show a FALSE condition.
4. Retract the flaps up. While the flaps are traveling up, check that the DATA indicator of the discrete input labeled ‘FLAP RETRACT’ changes to a TRUE condition.
5. When the flap motion is completed, verify the DATA indicators of the discrete inputs labeled ‘FLAP EXTEND’ and ‘FLAP RETRACT’ show a FALSE condition.
6. Repeat steps 1 through 5 for GIA2.
7. The flap discrete input check is complete.

4.9 Slip Clutch Torque Check Procedure and Servo Current Display Check

To perform the Automatic Slip Clutch Test Procedure in Section 4.9.1, all G1000 and GFC 700 equipment must be installed and operational.

4.9.1 Automatic Slip Clutch Test Procedure

Start the G1000 system in Configuration Mode and go to the GFC Page Group and select the GFC STATUS Configuration Page using the FMS knob. Perform the following checks:

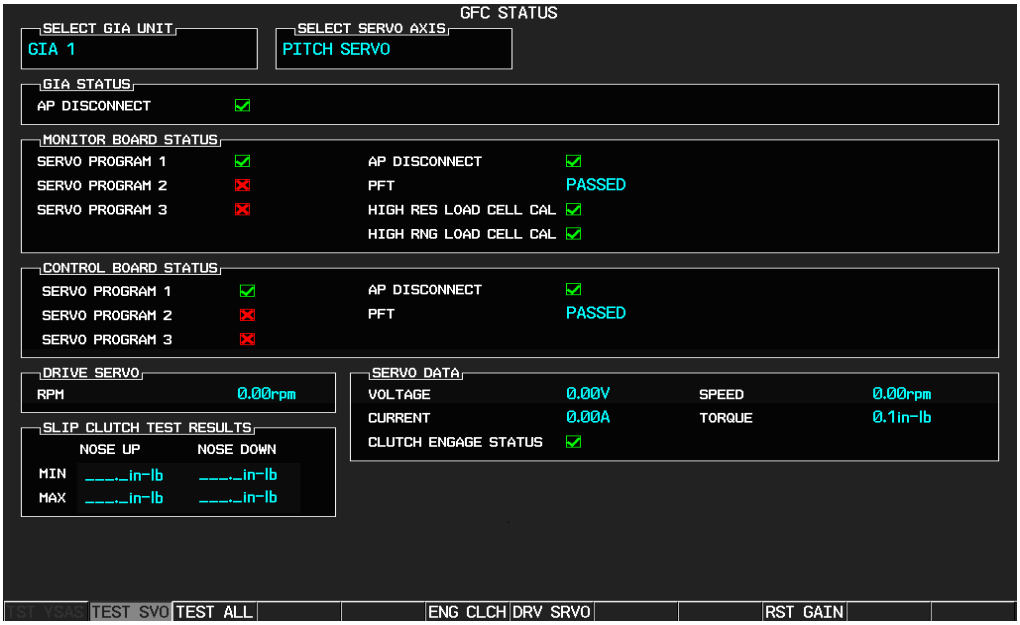


Figure 4-4 GFC Status Page

NOTE

The displayed test results on the PFD are not stored in G1000 memory. If power is cycled, these values will be lost. However, these test values are not lost by changing configuration mode pages.

IMPORTANT!

It is highly recommended that the following test be performed at temperatures between 50° F and 120° F.

1. Use the FMS knob to select the desired servo.
2. Verify that the PFT status field shows PASSED.
3. Verify that the aircraft control surface to be checked is free to travel throughout its range of motion.
4. Press the ENG CLCH softkey on the PFD.
5. With the clutch engaged, take hold of the aircraft controls and manually overcome the clutch. Move the control surface to be tested from stop to stop a minimum of two times each direction.
6. Position the control surface in the neutral position (full aft position if the PITCH SERVO is selected). Press the DIS CLCH softkey.

7. Press the TEST SVO softkey. Highlight YES and press the ENT key.

IMPORTANT!

Once the test starts the servo will begin to move the aircraft controls. If, for any reason, the test must be stopped, firmly grasp the aircraft control being moved and press the red AP DISC switch on the aircraft control stick.

8. The test begins, and the selected servo drives the control surface to either the NOSE UP stop (Pitch & Pitch Trim), or the LEFT stop (Roll and Yaw). If the PITCH SERVO is selected, firmly hold the control yoke in the full aft position until the NOSE UP portion of the test is completed
9. Upon reaching the control stop, the test initializes and begins a 50 second data collection period, where the servo is commanded to drive at ~2.5 rpm while the servo load cell measures clutch torque.
10. Monitor the CURRENT field and verify that the current displayed is greater than zero.
11. After the data is collected and processed, the test displays the results of the first direction on the PFD. The servo immediately begins to drive in the opposite direction toward the opposite control stop. If the PITCH SERVO is selected, let the control yoke move to the full forward position.
12. Upon reaching the stop, the test repeats the data collection process and displays the results on the PFD.
13. Firmly grasp the aircraft control under test and press the red AP DISC button to relieve any control tension. Press the ENT key to acknowledge the COMPLETE prompt on the PFD.
14. Record the clutch measurement values in Table 4-9, or in the appropriate aircraft maintenance records.
15. Repeat this procedure for each servo axis.
16. Verify that the minimum and maximum torque values measured are within the Minimum and Maximum torque values allowed, for the given axis, listed in Table 4-9.

Axis	Direction	Min Measured Torque (in-lbs)	Max Measured Torque (in-lbs)	Min Allowed Torque (in-lbs)	Max Allowed Torque (in-lbs)
Pitch	Up			76	105
	Down				
Roll	Left			63	87
	Right				
Yaw	Left			56	99
	Right				
Pitch Trim	Up			39	53
	Down				

Table 4-9. Measured Torque

NOTE

If the measured values exceed the limits in Table 4-9, the servo must be removed from the aircraft and tested/adjusted per the Servo Adjustment Fixture Procedure in Section 4.9.3.

4.9.2 Abnormal Test Prompts

During the testing, the following prompts may be displayed indicating an abnormality encountered during the test. Use the following guidelines to troubleshoot.

Message Prompt	Probable Cause	Action
STOP NOT REACHED	The servo did not detect a torque value which exceeded 70% of the established mechanical torque limit within 1 minute of starting the test. A low slip clutch setting is the likely cause.	Repeat test. If the same result is received, remove servo mount and check/set clutch on stand.
SERVO TORQUE TOO HIGH	The servo detected an average torque value which exceeded 130% of the established mechanical torque limit. Likely causes include a high slip clutch setting, or excess friction encountered during the control surface travel.	Engage the autopilot for the axis which reported torque to high. Manually operate the controls and verify that the clutch can be overridden. If the clutch can slip, repeat the test again. Otherwise remove the servo mount and reset the clutch. Check control friction against aircraft maintenance specifications. If the same result is received on retest, remove servo mount and check/set clutch on stand.
SERVO TORQUE TOO LOW	The servo detected an average torque value which fell below 70% of the established mechanical torque limit after detecting that the stop was reached. Likely causes include a low slip clutch setting or a disturbance in the controls before reaching the stop.	Repeat test again. If the same result is received, remove servo mount and check/set clutch on stand.
INVALID SERVO SPEED	The servo is unable to maintain the required ~2.5 RPM during the test (Speed drops below 2 RPM or exceeds 3 RPM)	Repeat test again. If the same result is received, remove servo mount and check/set clutch on stand. If resetting clutch does not clear message, replace servo motor.
TEST SPEED FAIL	Servo has not responded to the test initialization command.	Repeat test again. If message does not clear, troubleshoot the servo and it's wiring for the source of the failure. Repeat test when the source of the servo failure has been corrected.
SERVO TEST TIMED OUT	Servo not responding for over 60 seconds during testing.	
SERVO DATA TIMED OUT	The servo has failed to transmit load cell sensor status.	
LOAD CELL INVALID	A special test monitor has detected an inequality between motor torque and load cell torque greater than the specified threshold. An out-of-calibration load cell may be the cause.	Replace servo motor and repeat test.
AIRBORNE STATUS	The G1000 system has detected airborne status, (determined by true airspeed) and has cancelled the test.	Verify the ADC is online. Check pitot/static system is free of obstructions and plumbing kinks. Repeat test.

4.9.3 Servo Adjustment Fixture Procedure

Remove the GSM 85A Servo Mount as per Section 6.12.

The slip clutch torque values must be checked, and adjusted if necessary, to the values listed in Table 4-10.

IMPORTANT!

This adjustment requires the use of the Garmin servo adjustment fixture, P/N T10-00110-01. For detailed operating instructions for the fixture, refer to GSA8X / GSM85(A) Installation Manual, listed in Table 1-3.

1. Perform this procedure within a temperature range of 50 °F to 120 °F.
2. If a protective cover is installed on the servo mount, remove the protective cover.
3. Place the servo mount on the slip-clutch adjustment fixture and secure with the toggle clamps. Install the fixture cable between the capstan under test and the fixture capstan. Remove the slack in the cable using the tension adjustment knob. Tighten the two wing nuts on bottom of fixture while holding the top thumbscrews.
4. Attach a socket to a calibrated torque wrench of appropriate range and place on top of the fixture capstan. Adjust the wrench support fixture so that it contacts the handle in the appropriate location.
5. Connect a 2 Amp, 24 V, DC power supply to the fixture.
6. Place the solenoid switch to "on" and move the direction switch to the clockwise or counter-clockwise position. Allow the clutch to rotate at least one revolution in each direction (note: the capstan itself is fixed.)
7. Adjust the nut on the capstan as needed to obtain the torque value for the given servo listed in Table 4-10, as shown on the torque wrench. Note: position the nut to align with holes in the capstan shaft to allow cotter pin installation.
8. Observe the torque reading for at least two full revolutions in each direction. Ensure that the minimum and maximum torque readings are within the tolerance specified. When finished, remove the fixture cable, and then remove the servo mount from the fixture. Install the cotter pin through the capstan nut and capstan shaft.
9. Install the GSM 85A Servo Mount as per Section 6.12.
10. The Slip Clutch Torque Check is complete.

Table 4-10. Slip Clutch Torque Settings

Servo	Pitch Trim	Pitch	Yaw	Roll
Slip Clutch Torque Value Setting	49 +/-6 in-lbs	88 +/-10 in-lbs	83 +/-10 in-lbs	73 +/-9 in-lbs

4.10 G1000 Redundant Connection Check

Perform the following steps to verify the following:

(A) The primary (PRI) and secondary (SEC) power sources for GIA 1, GRS 1, PFD 1, and GDC 1

(B) The AHRS and ADC data path

(C) PFD and MFD Ethernet connection (includes ARINC connection between ADC and MFD and DISPLAY BACKUP button function)

(D) Engine data availability to the displays and GPS data availability to the AHRS with either GIA inoperative:

NOTE

Reference Table 3-1 for interpretation of data indicator symbols

(A) PRI and SEC power sources for PFD 1, GIA 1, GRS 1 and GDC 1 check

1. Place the G1000 in configuration mode and access the System Status page on PFD 1 using the FMS knob.
2. Verify that PFD 1, PFD 2, GIA 1, and GIA 2 show a valid indicator at the top of the screen.
3. Activate the cursor and scroll to GRS 1. Verify that STATUS shows OK.
4. Scroll to GDC 1. Verify that STATUS shows OK.
5. Pull the following circuit breakers on the right hand circuit breaker panel:
   a. PFD 1 (PRI)
   b. AHRS 1 (PRI)
   c. ADC 1 (PRI)
   d. GIA 1 (PRI)
6. Wait at least 5 seconds, then repeat steps 2, 3, and 4.
7. Close the circuit breakers listed in step 5.
8. Repeat steps 2, 3, and 4.
9. Pull the following circuit breakers on the right hand circuit breaker panel:
   a. PFD 1 (SEC)
   b. AHRS 1 (SEC)
   c. ADC 1 (SEC)
   d. GIA 1 (SEC)
10. Wait at least 5 seconds, then repeat steps 2, 3, and 4.
11. Close the circuit breakers listed in step 9.

(B) AHRS and ADC data path check

1. In the GIA page group, go to the GIA RS-232/ARINC 429 CONFIG page.
2. With GIA1 selected in the SELECT UNIT window, verify the RS232 Channel 1 (GDC74 #1) and RS232 Channel 6 (GRS77 #1) show valid indicators. Ref. Section 5.2.1.2.

3. With GIA1 selected in the SELECT UNIT window, verify the ARINC 429 IN5 (GDC74 #1) and ARINC 429 IN6 (GRS77 #1) show valid indicators. Ref. Section 5.2.1.2.
4. With GIA2 selected in the SELECT UNIT window, verify the RS232 Channel 1 (GDC74 #2) and RS232 Channel 6 (GRS77 #2) show valid indicators. Ref. Section 5.2.1.2.
5. With GIA2 selected in the SELECT UNIT window, verify the ARINC 429 IN5 (GDC74 #2) and ARINC 429 IN6 (GRS77 #2) show valid indicators. Ref. Section 5.2.1.2.
6. In the PFD page group, go to the GIA RS-232/ARINC 429 CONFIG page.
7. With PFD1 selected in the SELECT UNIT window, verify the ARINC 429 IN1 (GRS77 #1) and ARINC 429 IN2 (GDC74 #1) show valid indicators. Ref. Section 5.2.1.1.
8. With PFD2 selected in the SELECT UNIT window, verify the ARINC 429 IN1 (GRS77 #2) and ARINC 429 IN2 (GDC74 #2) show valid indicators. Ref. Section 5.2.1.1.

(C) PFD and MFD Ethernet connection check (includes ARINC connection check between ADC1 and MFD and between GRS1 and MFD, and the DISPLAY BACKUP button check)

1. Re-start PFD 2, PFD 1 and MFD in normal mode.
2. On the right hand circuit breaker panel, open the MFD circuit breaker:
3. Verify NAV 1, COM 1, NAV 2 and COM 2 remain valid on both PFD 1 and PFD 2.
4. Close the MFD circuit breaker and wait for MFD to initialize:
5. Open the PFD 2 circuit breaker:
6. Press the DISPLAY BACK UP button the Pilot's GMA 1347D audio panel.
7. Verify NAV 2 and COM 2 are each replaced by a red X and NAV 1 and COM 1 remain valid on both the MFD and PFD 1.
8. Press the DISPLAY BACK UP button the Pilot's GMA 1347D audio panel to return to normal mode.
9. Close the PFD 2 circuit breaker and wait for PFD 2 to initialize:
10. Open the PFD 1 (PRI) and PFD 1 (SEC) circuit breakers:
11. Press the DISPLAY BACK UP button the Co-pilot's GMA 1347D audio panel.
12. Verify NAV 1 and COM 1 are each replaced by a red X and NAV 2 and COM 2 remain valid on both the MFD and PFD 2.
13. Press the DISPLAY BACK UP button the Co-pilot's GMA 1347D audio panel to return to normal mode.
14. Close the PFD 1 (PRI) and PFD 1 (SEC) circuit breakers and wait for PFD 1 to initialize:

(D) Engine data availability to the displays and GPS data availability to the AHRS with either GIA inoperative check

1. Open GIA1 primary and secondary CBs.
2. Verify the following:
    a. NAV 1 and COMM1 tuning fields on PFD 1 and PFD 2 are invalid (red X).
    b. L/R engine data remains valid.
    c. XPDR1 is Inoperative.
    d. GMA1 Is Inoperative.

e. AHRS1 is using backup GPS source.

f. AHRS2 not receiving backup GPS Information.

g. An amber BOTH ON GPS2 is displayed on PFD 1 and PFD 2.

h. AHRS and ADC data remain valid on PFD 1 and PFD 2.

3. Close GIA1 primary and secondary CBs. Allow system to re-acquire satellites and return to normal display modes.

4. Open GIA2 CB.

5. Verify the following:

a. NAV2 and COMM2 tuning fields on PFD 1 and PFD 2 are invalid (red X).

b. L/R engine data remains valid.

c. XPDR2 is Inoperative.

d. GMA2 Is Inoperative.

e. AHRS2 is using backup GPS source.

f. AHRS1 not receiving backup GPS Information.

g. An amber BOTH ON GPS1 is displayed on PFD 1 and PFD 2.

h. AHRS and ADC data remain valid on PFD 1 and PFD 2.

6. Close GIA2 CB. Allow system to re-acquire satellites and return to normal display modes.

7. Open GIA1 primary and secondary CBs and GIA2 CB.

8. Verify the following:

a. COM1/NAV1 & COM2/NAV2 fields flag invalid.

b. GPS CDI flags DR on PFD.

c. NAV1 & NAV2 CDI loses deviation bar.

d. XPDR field flags invalid on PFD.

e. Engine Instrument field flags invalid on MFD.

f. All AHRS & ADC fields remain valid.

g. Red AFCS status annunciation given.

h. If equipped with TAWS, TAWS FAIL annunciation given.

i. If equipped with ADF and/or DME, ADF/DME windows flag invalid.

9. Restore power to both GIA units.

The Redundant Connections Check is complete.

4.11 Engine Data Check (GIA 1 or GIA 2 Inoperative)

NOTE

This procedure should be accomplished in conjunction with the engine run-up. Valid engine indications will be needed.

Do the following to verify the engine data availability and validity, with GIA 1 or GIA 2 inoperative:

1. Ensure the G1000 is in normal mode.
2. With engines running, note the indication values for torque, ITT and oil pressure.
3. On the right hand circuit breaker panel, open the GIA1 (PRI) and GIA1 (SEC) circuit breakers.
4. Verify the values for torque, ITT and oil pressure remain unchanged.
5. Close the GIA1 (PRI) and GIA1 (SEC) circuit breakers and wait until the COM1 and NAV1 fields are valid.
6. Open the GIA2 circuit breaker.
7. Verify the values for torque, ITT and oil pressure remain unchanged.
8. Close the GIA2 circuit breaker and wait until the COM2 and NAV2 fields are valid.
9. Put the G1000 in Reversionary mode.
10. Repeat steps 2 through 8, verifying engine gauge indications on PFD 1, MFD and PFD 2.
11. The Engine Data Check is complete.

4.12 Trim Annunciator Check

This procedure will check the trim annunciation from both GIA 1 and GIA 2.

1. Ensure the G1000 is in normal mode and the autopilot is not engaged.
2. Press the left part of the pilot's pitch-trim switch upwards for approximately 10 seconds and verify that the red PTRM annunciation is displayed on both PFD 1 and PFD 2.
3. Press the left part of the pilot's pitch-trim switch downwards for approximately 10 seconds and verify that the red PTRM annunciation is displayed on both PFD 1 and PFD 2.
4. Repeat Steps 2 and 3 for the right part of the pilot's pitch-trim switch.
5. Repeat Steps 2 through 4 for the copilot's pitch-trim switch.
6. Select copilot side by pressing the XFR key on the mode controller (changes active GIA to GIA 2).
7. Repeat Steps 2 through 5 and verify annunciations are displayed on both PFD 1 and PFD 2.
8. Re-select pilot side by pressing XFR key on the mode controller (changes active GIA back to GIA 1).
9. Move the control yoke to the center position and hold and center the pitch trim wheel.
10. Engage the autopilot and apply a forward load on the control yoke. Verify that the pitch trim wheel rotates in appropriate direction.
11. Disconnect the autopilot by pressing the copilot side AP DISC button.
12. Use the pitch-trim switch (or the pitch-trim wheel) to trim full down.
13. Move the control yoke to the full forward position and hold.

14. Engage the autopilot, maintain the control yoke in the forward position and keep the pitch-trim wheel from rotating for approximately five seconds. Verify that the red PTRM annunciator is displayed on both PFD 1 and PFD 2.
15. Disengage the autopilot and use the pitch-trim switch (or the pitch-trim wheel) to trim full up.
16. Move the control yoke to the full aft position and hold.
17. Engage the autopilot, maintain the control yoke in the aft position and keep the pitch-trim wheel from rotating for approximately five seconds. Verify that the red PTRM annunciator is displayed on both PFD 1 and PFD 2.
18. Disengage the autopilot and use the pitch-trim switch (or the pitch-trim wheel) to trim full up.
19. Move the control yoke to the full forward position and hold.
20. Engage the autopilot, apply firm aft pressure on the control yoke for approximately 15 seconds, allowing the pitch-trim wheel to move freely. Verify that the amber ELE annunciator is displayed on both PFD 1 and PFD 2.
21. Disengage the autopilot and use the pitch-trim switch (or the pitch-trim wheel) to trim full down.
22. Move the control yoke to the full aft position and hold.
23. Engage the autopilot, apply firm forward pressure on the control yoke for approximately 15 seconds, allowing the pitch-trim wheel to move freely. Verify that the amber ELE annunciator is displayed on both PFD 1 and PFD 2.
24. Disengage the autopilot and rotate the control yoke to the full left position and hold.
25. Engage the autopilot, apply firm right load on the control yoke for approximately 10 seconds. Verify that the amber AIL annunciator is displayed on both PFD 1 and PFD 2.
26. Disengage the autopilot and rotate the control yoke to the full right position and hold.
27. Engage the autopilot, apply firm left load on the control yoke for approximately 10 seconds. Verify that the amber AIL annunciator is displayed on both PFD 1 and PFD 2.
28. Disengage the autopilot.
29. Engage the autopilot, apply firm load on the right rudder pedal for approximately 15 seconds. Verify that the amber RUD annunciator is displayed on both PFD 1 and PFD 2.
30. Disengage the autopilot.
31. Engage the autopilot, apply firm load on the left rudder pedal for approximately 15 seconds. Verify that the amber RUD annunciator is displayed on both PFD 1 and PFD 2.
32. The Trim Annunciator Check is complete.

4.13 G1000 Miscompare Checks

This procedure will check the AHRS, airspeed and altitude miscompare monitors. Accomplish the following checks with the aircraft positioned where it can receive GPS signals and magnetic heading. Access to AHRS1 and AHRS2 will be required during this test.

1. Ensure the G1000 is operating in normal mode.
2. Connect a pitot/static test set to the aircraft ADC1 pitot and static ports (Pilot's side). (Do not connect the pitot/static tester to ADC2 ports at this time)
3. Set the baro-correction on PFD1 and PFD2 to 29.92.

4. On the AFCS mode controller, press the AP button and verify autopilot engages.
5. Slowly increase the pitot/static test set to simulate an ADC1 / ADC2 altitude miscompare of greater than 200 ft., verify ADC2 altitude does not increase, autopilot does not disconnect and amber comparator window text "ALT MISCOMP" is displayed on PFD1 and PFD2.
6. Reduce ADC1 altitude to ambient pressure.
7. Repeat Step 5 with the pitot/static test set connected to the aircraft ADC2 pitot and static ports.
8. Use the pitot/static test set to simulate an airspeed of 40 kts for ADC1 and 55 kts for ADC2. Verify the autopilot does not disconnect and amber comparator window text "IAS MISCOMP" is displayed on PFD 1 and PFD2.
9. Use the pitot/static test set to simulate an airspeed of 55 kts for ADC1 and 40 kts for ADC2. Verify the autopilot does not disconnect and amber comparator window text "IAS MISCOMP" is displayed on PFD 1 and PFD2.
10. Use the pitot/static test set to simulate an airspeed of 85 kts for ADC1 and 95 kts for ADC2. Verify the autopilot does not disconnect and amber comparator window text "IAS MISCOMP" is displayed on PFD 1 and PFD2.
11. Use the pitot/static test set to simulate an airspeed of 95 kts for ADC1 and 85 kts for ADC2. Verify the autopilot does not disconnect and amber comparator window text "IAS MISCOMP" is displayed on PFD 1 and PFD2.
12. Reduce ADC1 and ADC2 airspeeds to 0 kts.
13. Slowly rotate AHRS1 along the lateral (pitch) axis to a pitch attitude of greater than 5 degrees, verify the following:
    a. AHRS2 pitch attitude does not change
    b. An amber "PIT MISCOMP" is annunciated on PFD1 and PFD2
    c. Autopilot disconnects at approximately 5 deg AHRS1 / AHRS2 miscompare
    d. The autopilot disconnect audio alert (two hi-low tones) sounds
    e. A red flashing AP annunciator on PFD1 and PFD2
    f. Flight director command bars remain in view with autopilot in HDG and ROL mode
14. Replace AHRS1 to normal attitude and verify that attitude display on PFD1 displays current aircraft attitude.
15. Use the AFCS mode controller to re-engage autopilot.
16. Slowly rotate AHRS1 along the longitudinal (roll) axis to a roll attitude of greater than 5 degrees, verify the following:
    a. AHRS2 roll attitude does not change
    b. An amber "ROL MISCOMP" is annunciated on PFD1 and PFD2
    c. Autopilot disconnects at approximately 5 deg AHRS1 / AHRS2 miscompare
    d. The autopilot disconnect audio alert (two hi-low tones) sounds
    e. A red flashing AP annunciator on PFD1 and PFD2
    f. Flight director command bars remain in view with autopilot in HDG and PIT mode
17. Replace AHRS1 to normal attitude and verify that attitude display on PFD1 displays current aircraft attitude.
18. Repeat Steps 13 through 17 for AHRS2.
19. The G1000 Miscompare checks are complete.

4.14 Nose Avionics Compartment Fans Operational Check

This procedure will verify that airflow is present from the ported avionics cooling fans to the #1 and #2 GIA and GTX units. The fan speed monitoring circuits and annunciations are checked by the G1000 Cooling System Electrical Check in Section 8.1.4 and a Visual Inspection of the fan hoses is accomplished in Section 4.4. This check requires the G1000 to be powered on.

1. Gain access to the nose avionics compartment.
2. Disconnect cooling fan hose from the pilot side GTX and verify airflow is present.
3. Reconnect the cooling fan hose to the GTX.
4. Disconnect cooling fan hose from the pilot side GIA GTX and verify airflow is present.
5. Reconnect the cooling fan hose to the GIA.
6. Repeat Steps 2 through 5 for the copilot side GTX and GIA.
7. The Nose Avionics Compartment Fans Operational Check is complete.

4.15 Instrument Panel Fans Operational Check

This procedure will verify that airflow is present from the PFD1, MFD and PFD2 cooling fans. The fan speed monitoring circuits and annunciations are checked by the G1000 Cooling System Electrical Check in Section 8.1.4. This check requires the G1000 to be powered on.

1. Remove PFD1 as described in Section 6.1.
2. Identify the PFD1 cooling fan and verify airflow is present.
3. Reinstall PFD1 as described in Section 6.1.
4. Repeat Steps 1 through 3 for the MFD and PFD2.
5. The Instrument Panel Fans Operational Check is complete.

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5 TROUBLESHOOTING

This section provides instructions and guidance for G1000 system troubleshooting, as installed in the King Air C90A/C90GT.

IMPORTANT!

Sections 6, 7 and 8 provide detailed instructions on equipment removal, replacement, configuration, and return-to-service testing. Anytime a G1000 component or LRU is removed, swapped, or replaced, the technician must follow the procedures given in Sections 6, 7 and 8 to ensure proper operation of the system.

Troubleshoot the G1000 system by first identifying, then isolating the specific failure to the responsible LRU. There are several indications that the G1000 presents to the pilot or technician, showing overall system condition. A course of action should be determined based on the information presented on the display. This section shows possible scenarios likely to be encountered during normal operation and gives troubleshooting guidance to the technician to resolve problems.

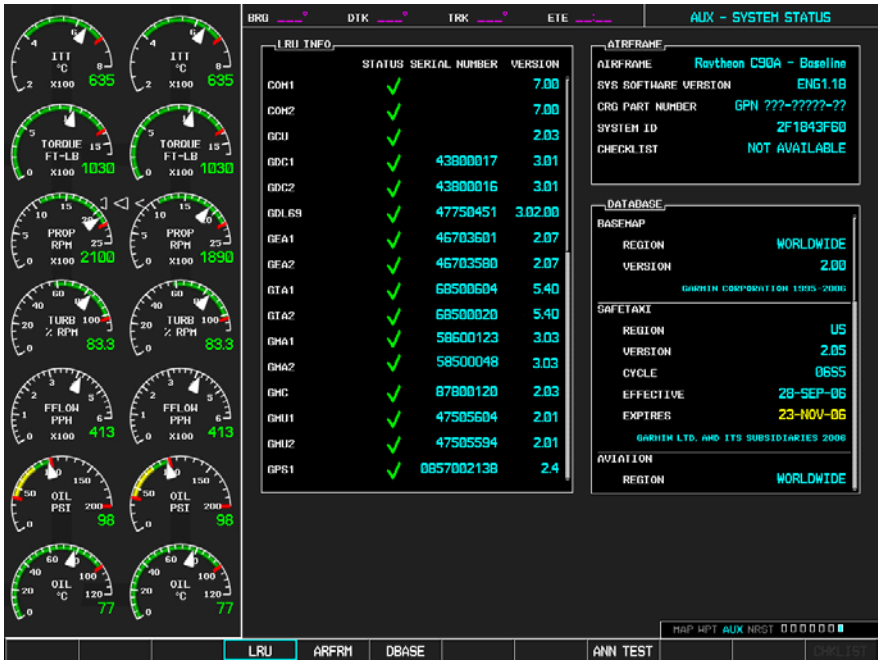


Figure 5-1. AUX – System Status Page

The AUX – System Status page is the 5th page in the AUX Page Group and displays the following information for each LRU and sub-function:

- Status: A green checkmark (√) is displayed for properly operating LRUs. A red 'x' appears when an internal LRU fault is detected and it has taken itself offline, or if the MFD can not communicate with the LRU.
- Serial Number: Each LRU serial number is displayed (functions such as GPS and GS are contained within an LRU; therefore, serial numbers are not shown for these).
- Current SW Version Loaded.

When troubleshooting, first check to ensure that each LRU status is a green checkmark (√) and that the correct software is loaded in each unit. Additional airframe and database information is also displayed on this page.

5.1 G1000 Alerting System

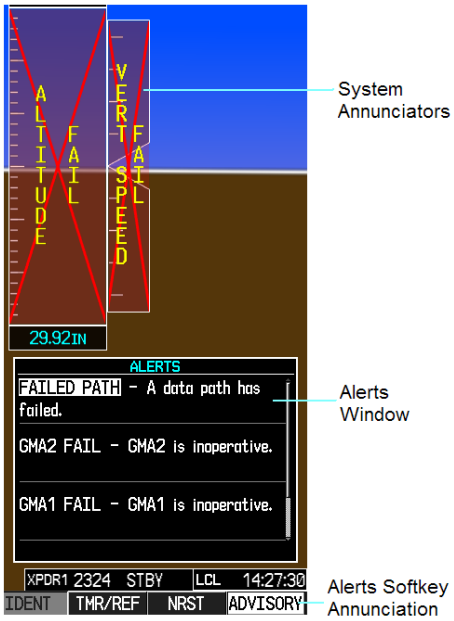


Figure 5-2. Alerts & Annunciations

The G1000 Alert System conveys alerts to the pilot using combinations of the following features:

Alert Window:

The Alert window displays alert text messages. Up to 64 prioritized alerts can be displayed in the Alert window. Pressing the ALERTS softkey displays the Alerts window. Pressing the ALERTS softkey again removes the Alerts window from the display.

Softkey Annunciation:

When the G1000 Alerting System issues an alert, the ALERTS softkey is used as a flashing annunciation to accompany the alert. During the alert, the ALERTS softkey assumes a new label consistent with the alert level (WARNING, CAUTION, or ADVISORY). Pressing the softkey annunciation acknowledges the presence of the alert and returns the softkey to its previous ALERTS label.

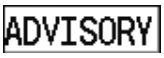


Figure 5-3. ADVISORY Softkey Annunciation

System Failure Annunciations:

Typically, a large red X appears in windows when a failure is detected in the LRU providing the information to the window.

5.1.1 Aural & Audio Alerts

The G1000 system is capable of issuing audio and aural (voice) alerts for various situations. The following alerts are utilized by the G1000:

Alert Name	Purpose
Traffic (voice)	TIS Traffic Advisory
No Traffic (voice)	TIS Traffic Unavailable
“Minimums, Minimums” (voice)	Minimums Aural Alert
Alt Alert	Altitude Alerting Function
“Caution Terrain, Caution Terrain” (voice) *and* “Terrain Ahead, Terrain Ahead” (voice)	TAWS **Caution** alert: Reduced required terrain clearance Or Imminent impact with terrain.
“Terrain Terrain, Pull Up Pull Up” (voice) *and* “Terrain Ahead Pull Up, Terrain Ahead Pull Up”	TAWS **Warning** alert: Reduced required terrain clearance Or Imminent impact with terrain.
“Too Low Terrain” (voice)	TAWS **Caution** alert: Premature descent alert (PDA)
“Sink Rate” (voice)	TAWS **Caution** alert: Ground Proximity envelope 1, 2, or 3, Excessive Descent Rate
“Pull Up” (voice)	TAWS **Warning** alert: Ground Proximity envelope 1, 2, or 3, Excessive Descent Rate
“Don’t Sink” (voice) *and* “Too Low Terrain”	TAWS **Caution** alert: Ground Proximity altitude loss after takeoff
“Five Hundred” (voice)	TAWS **Caution** alert: Ground proximity voice callout
“Caution Obstacle, Caution Obstacle” (voice) or “Obstacle Ahead, Obstacle Ahead ” (voice)	TAWS **Caution** alert: Obstacle awareness caution.
“Obstacle Obstacle Pull Up Pull Up” (voice) or “Obstacle Ahead Pull Up, Obstacle Ahead Pull Up” (voice)	TAWS **Warning** alert: Obstacle awareness warning.
“TAWS System Failure” (voice)	TAWS status alert: Terrain failure
“TAWS Not Available” (voice)	TAWS status alert: Terrain not available
“TAWS System Test, OK” (voice)(If passed) or “TAWS System Failure” (voice) (If test failed)	TAWS status alert: Terrain self-test
“TAWS Available” (voice)	TAWS status alert: Terrain available
“Vertical Track” (voice)	Vertical navigation alerting function

5.2 System Annunciations

If data fields become invalid due to an LRU failure, the PFD/MFD typically annunciates the failure with a large red X, as shown in Figure 5-4.

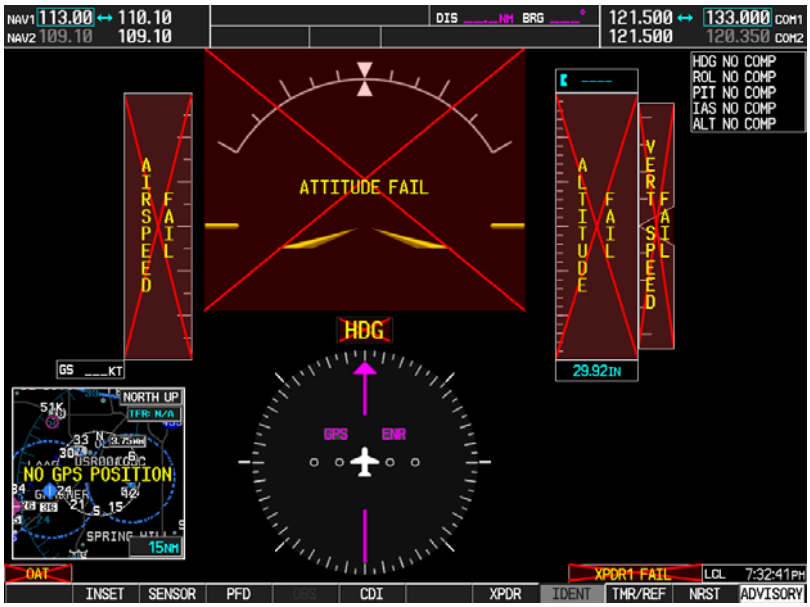


Figure 5-4. System Annunciations

5.2.1 Failed Path Messages

The following message indicates there is a data path connected to the GDU (PFD1, PFD1, or MFD) or the GIA 63W (1 or 2) that has failed.

FAILED PATH – A data path has failed.

The **FAILED PATH** message is triggered by a timeout of any one digital channel. The channels that are checked are listed on these pages in config mode:

1) GDU RS-232 / ARINC 429 CONFIG (PFD1/2, and MFD)
2) GIA RS-232 / ARINC 429 CONFIG (GIA1 and GIA2)
3) GIA CAN / RS-485 CONFIGURATION (GIA1 and GIA2)

IMPORTANT!

Once the FAILED PATH message has been triggered, it will remain on the list of messages until the next power cycle. This latching was implemented so that for intermittent failures, the message would remain at the end of the flight (to alert maintenance crew). Also, this keeps the crew from having to acknowledge message repeatedly in the case of intermittent failures.

NOTE

Reference Table 3-1 for interpretation of data indicator symbols

The box next to each channel indicates the current status of the channel per the below:

- Red X = data path is known to be failed
- Amber question mark (?) = data path status is unknown
- Green checkmark (✓)= data path is known to be good

The applicable data paths can be verified by viewing the configuration mode pages listed below.

5.2.1.1 GDU RS-232 / ARINC 429 CONFIG Page

PFD 1 RS-232

Channel	LRU	Indicator	Status
CHNL 2	GMC 710		PFD1/GMC 710 data path is functioning correctly.
			PFD1/GMC 710 data path is not functioning correctly. • Verify GMC710 is powered on. o If GMC 710 will not power on, remove unit and verify power and ground are present at the GMC connector. ▪ If power or ground is not present, troubleshoot aircraft wiring for faults. ▪ If power and ground are present, replace GMC 710. • Load PFD1 and GMC 710 configuration files. • Swap PFD1and PFD2 to confirm if the problem is in the original PFD1. o Replace original PFD1 if box turns to a green checkmark (√) after swapping displays. • Check the PFD1/GMC 710 interconnect wiring for faults. Replace GMC 710 if problem remains.
			PFD1/GMC 710 data path functionality is unknown. Reload PFD1 configuration file.

PFD 1 ARINC 429

Channel	LRU	Indicator	Status
IN 1	GRS 77 #1		PFD1/GRS 77 #1 data path is functioning correctly.
			PFD1/GRS 77 #1 data path is not functioning correctly. • Verify GRS77 #1 status is "OK" using the System Status page on the MFD. If it is not, correct condition before proceeding, reference GRS troubleshooting sections. • Load PFD1 configuration file. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD1. o Replace original PFD1 if box turns to a green checkmark (√) after swapping displays. • Swap GRS1 and GRS2 (no reconfiguration required) to confirm if the problem is in the original GRS1. o Replace original GRS1 if box turns to a green checkmark (√) after swapping units. Check the PFD1/GRS 77 #1 interconnect wiring for faults.
			PFD1/GRS 77 #1 data path functionally is unknown. Reload PFD1 configuration file.
IN 2	GDC 74 #1		PFD1/GDC 74 #1 data path is functioning correctly
			PFD1/GDC 74 #1 data path is not functioning correctly. • Verify GDC 74 #1 status is "OK" using the System Status page on the MFD. If it is not, correct condition before proceeding, reference GDC troubleshooting sections. • Load PFD1 and GDC 74 #1 configuration files. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD1. o Replace original PFD1 if box turns to a green checkmark (√) after swapping displays. • Check the PFD1/GDC 74 #1 interconnect wiring for faults. Replace GDC 74 #1 if problem remains.
			PFD1/GDC 74 #1 data path functionality is unknown. Reload PFD1 configuration file.

PFD 2 RS-232

Channel	LRU	Indicator	Status
CHNL 2	GMC 710		PFD2/GMC 710 data path is functioning correctly.

			PFD2/GMC 710 data path is not functioning correctly.
			• Verify GMC 710 is powered on.
			  o If GMC 710 will not power on, remove unit and verify power and ground are present at the GMC connector.
			  ▪ If power or ground is not present, troubleshoot aircraft wiring for faults.
			  ▪ If power and ground are present, replace GMC 710.
			• Load PFD2 and GMC 710 configuration files.
			• Swap PFD2 and PFD1 to confirm if the problem is in the original PFD2.
			  o Replace original PFD2 if box turns to a green checkmark (√) after swapping displays.
			• Check the PFD2/GMC 710 interconnect wiring for faults.
			Replace GMC 710 if problem remains.

			PFD2/GMC 710 data path functionality is unknown. Reload PFD2 configuration file.

PFD 2 ARINC 429

Channel	LRU	Indicator	Status
IN 1	GRS 77 #2		PFD2/GRS 77 #2 data path is functioning correctly.
			PFD2/GRS 77 #2 data path is not functioning correctly. • Verify GRS77 #2 status is "OK" using the System Status page on the MFD. If it is not, correct condition before proceeding, reference GRS troubleshooting sections. • Load PFD2 configuration file. • Swap PFD2 and PFD1 to confirm if the problem is in the original PFD2. o Replace original PFD2 if box turns to a green checkmark (√) after swapping displays. • Swap GRS1 and GRS2 (no reconfiguration required) to confirm if the problem is in the original GRS1. o Replace original GRS1 if box turns green after swapping units. • Check the PFD2/GRS 77 #2 interconnect wiring for faults.
			PFD2/GRS 77 #2 data path functionality is unknown. Reload PFD2 configuration file.
IN 2	GDC 74 #2		PFD2/GDC 74 #2 data path is functioning correctly.
			PFD2/GDC 74 #2 data path is not functioning correctly. • Verify GDC 74 #2 status is "OK" using the System Status page on the MFD. If it is not, correct condition before proceeding, reference GDC troubleshooting sections. • Load PFD2 and GDC 74 #2 configuration files. • Swap PFD2 and PFD1 to confirm if the problem is in the original PFD2. o Replace original PFD2 if box turns to a green checkmark (√) after swapping displays. • Check the PFD2/GDC 74 #2 interconnect wiring for faults. Replace GDC 74 #2 if problem remains.
			PFD2/GDC 74 #2 data path functionality is unknown. Reload PFD2 configuration file.

MFD1 RS-232

Channel	LRU	Indicator	Status
CHNL 1	GCU 475		MFD1/GCU 475 data path is functioning correctly.

			MFD1/GCU 475 data path is not functioning correctly.
			• Verify GCU 475 is powered on.
			  o If GCU 475 will not power on, remove unit and verify power and ground are present at the GCU connector.
			  ▪ If power or ground is not present, troubleshoot aircraft wiring for faults.
			  ▪ If power and ground are present, replace GCU 475.
			• Load MFD1 and GCU 475 configuration files.
			• Check the MFD1/GCU 475 interconnect wiring for faults.
			• Replace GCU 475.
			Replace MFD if problem remains.

			MFD1/GCU data path functionality is unknown. Reload MFD1 configuration file.

5.2.1.2 GIA RS-232 / ARINC 429 CONFIG Page

GIA1 RS-232

Channel	LRU	Indicator	Status
CHNL 1	GDC 74 #1		GIA1/GDC 74 #1 data path is functioning correctly.
			GIA1/GDC 74 #1 data path is not functioning correctly. • Load GIA1 and GDC 74 #1 configuration files. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA1 if box turns to a green checkmark (√) after swapping units. • Check the GIA1/GDC 74 #1 interconnect wiring for faults. Replace GDC 74 #1 if problem remains.
			GIA1/GDC 74 #1 data path functionality is unknown. Reload GIA1 configuration files.
CHNL 2	GRS 77 #2 (output only)		GIA1/GRS 77 #2 output data path is not monitored. A black box N/A is normal.

CHNL 5	GTX 33D #1 w/TIS	✓	GIA1/GTX 33 #1 data path is functioning correctly.
		✗	GIA1/GTX 33 #1 data path is not functioning correctly. • Load GIA1 and GTX 33 #1 configuration files. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA1 if box turns to a green checkmark (√) after swapping units. • Check the GIA1/GTX 33 #1 interconnect wiring for faults. Replace GTX 33 #1 if problem remains.
		?	GIA1/GTX 33D #1 data path functionality is unknown. Reload GIA1 configuration files.
CHNL 6	GRS 77 #1	✓	GIA1/GRS 77 #1 data path is functioning correctly.
		✗	GIA1/GRS 77 #1 data path is not functioning correctly. • Load GIA1 configuration files. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA1 if box turns to a green checkmark (√) after swapping units. • Swap GRS1 and GRS2 (no reconfiguration required) to confirm if the problem is in the original GRS1. o Replace original GRS1 if box turns to a green checkmark (√) after swapping units. Check the GIA1/GRS 77 #1 interconnect wiring for faults.
		?	GIA1/GRS 77 #1 data path functionality is unknown. Reload GIA1 configuration files.
CHNL 7	GMA 1347 #1	✓	GIA1/GMA 1347 #1 data path is functioning correctly.
		✗	GIA1/GMA 1347 #1 data path is not functioning correctly. • Load GIA1 and GMA 1347 #1 configuration files. • Swap GMA 1347 #1 and GMA 1347 #2, reconfigure both GMA's to their new locations, to confirm if the problem is in the original GMA 1347 #1. o Replace original GMA 1347 #1 if box turns to a green checkmark (√) after swapping units. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA1 if box turns to a green checkmark (√) after swapping units. Check the GIA1/GMA 1347 #1 interconnect wiring for faults.
		?	GIA1/GMA 1347D #1 data path functionality is unknown. Reload GIA1 configuration files.

GIA1 ARINC 429

Channel	LRU	Indicator	Status
IN 5	GDC 74 #1		GIA1/GDC 74 #1 data path is functioning correctly.
			GIA1/GDC 74 #1 data path is not functioning correctly. • Load GIA1 and GDC 74 #1 configuration files. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA1 if box turns to a green checkmark (√) after swapping units. • Check the GIA1/GDC 74 #1 interconnect wiring for faults. Replace GDC 74 #1 if problem remains.
			GIA1/GDC 74 #1 data path functionality is unknown. Reload GIA1 configuration files.
IN 6	GRS 77 #1		GIA1/GRS 77 #1 data path is functioning correctly.
			GIA1/GRS 77 #1 data path is not functioning correctly. • Load GIA1 configuration files. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA1 if box turns to a green checkmark (√) after swapping units. • Swap GRS1 and GRS2 (no reconfiguration required, ref. GRS Configuration and Testing sections) to confirm if the problem is in the original GRS1. o Replace original GRS1 if box turns to a green checkmark (√) after swapping units. Check the GIA1/GRS 77 #1 interconnect wiring for faults.
			GIA1/GRS 77 #1 data path functionality is unknown. Reload GIA1 configuration files.

GIA2 RS-232

Channel	LRU	Indicator	Status
CHNL 1	GDC 74B #2		GIA2/GDC 74 #2 data path is functioning correctly.
			GIA2/GDC 74 #2 data path is not functioning correctly. • Load GIA2 and GDC 74 #2 configuration files. • Swap GIA2 and GIA1, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA2 if box turns to a green checkmark (√) after swapping units. • Check the GIA1/GDC 74 #2 interconnect wiring for faults. Replace GDC 74 #2 if problem remains.
			GIA2/GDC 74B #2 data path functionality is unknown. Reload GIA2 configuration files.
CHNL 2	GRS 77 #1 (output only)		GIA2/GRS 77 #1 output data path is not monitored. A black N/A box is normal.
CHNL 5	GTX 33/33D #2 w/TIS		GIA2/GTX 33 #2 data path is functioning correctly.
			GIA2/GTX 33 #2 data path is not functioning correctly. • Load GIA2 and GTX 33 #2 configuration files. • Swap GIA2 and GIA1, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA2 if box turns to a green checkmark (√) after swapping units. • Check the GIA2/GTX 33/33D #2 interconnect wiring for faults. Replace GTX 33/33D #2 if problem remains.
			GIA2/GTX 33 #2 data path functionality is unknown. Reload GIA2 configuration files.

CHNL 6	GRS 77 #2		GIA2/GRS 77 #2 data path is functioning correctly.
			GIA2/GRS 77 #2 data path is not functioning correctly. • Load GIA2 configuration files. • Swap GIA2 and GIA1, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA2 if box turns to a green checkmark (√) after swapping units. • Swap GRS2 and GRS1 (no reconfiguration required) to confirm if the problem is in the original GRS2. o Replace original GRS2 if box turns to a green checkmark (√) after swapping units. Check the GIA2/GRS 77 #2 interconnect wiring for faults.
			GIA2/GRS 77 #2 data path functionality is unknown. Reload GIA2 configuration files.
CHNL 7	GMA 1347 #2		GIA2/GMA 1347 #2 data path is functioning correctly.
			GIA2/GMA 1347 #2 data path is not functioning correctly. • Load GIA2 and GMA 1347 #2 configuration files. • Swap GMA 1347 #2 and GMA 1347 #1, reconfigure both GMA's to their new locations to confirm if the problem is in the original GMA 1347 #2. o Replace original GMA 1347 #2 if box turns to a green checkmark (√) after swapping units. • Swap GIA2 and GIA1, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. o Replace original GIA2 if box turns to a green checkmark (√) after swapping units. Check the GIA1/GMA 1347 #2 interconnect wiring for faults.
			GIA1/GMA 1347 #2 data path functionality is unknown. Reload GIA2 configuration files.

GIA2 ARINC 429

Channel	LRU	Indicator	Status
IN 5	GDC 74 #2	✓	GIA2/GDC 74 #2 data path is functioning correctly.
		✗	GIA2/GDC 74 #2 data path is not functioning correctly. • Load GIA2 and GDC 74 #2 configuration files. • Swap GIA2 and GIA1, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. o Replace original GIA2 if box turns to a green checkmark (√) after swapping units. • Check the GIA2/GDC 74 #2 interconnect wiring for faults. Replace GDC 74 #2 if problem remains.
		?	GIA2/GDC 74 #2 data path functionality is unknown. Reload GIA2 configuration files.
IN 6	GRS 77 #2	✓	GIA2/GRS 77 #2 data path is functioning correctly.
		✗	GIA2/GRS 77 #2 data path is not functioning correctly. • Load GIA2 configuration files. • Swap GIA2 and GIA1, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. o Replace original GIA2 if box turns to a green checkmark (√) after swapping units. • Swap GRS2 and GRS1 (no reconfiguration required) to confirm if the problem is in the original GRS2. o Replace original GRS2 if box turns to a green checkmark (√) after swapping units. Check the GIA2/GRS 77 #2 interconnect wiring for faults.
		?	GIA2/GRS 77 #2 data path functionality is unknown. Reload GIA2 configuration files.

5.2.1.3 GIA CAN / RS-485 CONFIGURATION Page

GIA1 RS-485

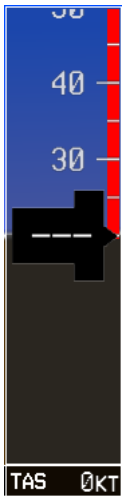
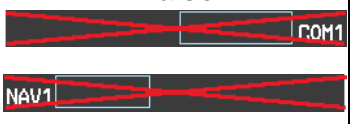
Channel	LRU	Indicator	Status
CHNL 1	GEA1	✓	GIA1/GEA1 data path is functioning correctly.
		✗	GIA1/GEA1 data path is not functioning correctly. • Verify GEA1 is powered on using the GEA Status page. • Load GIA1 and GEA1 configuration files. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA1 if box turns to a green checkmark (√) after swapping units. • Swap GEA1 and GEA2, reconfigure both GEA's to their new locations to confirm if the problem is in the original GEA1. o Replace original GEA1 if box turns to a green checkmark (√) after swapping units. Check the GIA1/GEA1 interconnect wiring for faults.
		?	GIA1/GEA1 data path functionality is unknown. Reload GIA1 configuration files.
CHNL 2	GEA2	✓	GIA1/GEA2 data path is functioning correctly.
		✗	GIA1/GEA2 data path is not functioning correctly. • Verify GEA2 is powered on using the GEA Status page. • Load GIA1 and GEA2 configuration files. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. o Replace original GIA1 if box turns to a green checkmark (√) after swapping units. • Swap GEA2 and GEA1, reconfigure both GEA's to their new locations to confirm if the problem is in the original GEA2. o Replace original GEA2 if box turns to a green checkmark (√) after swapping units. Check the GIA1/GEA2 interconnect wiring for faults.
		?	GIA1/GEA2 data path functionality is unknown. Reload GIA1 configuration files.
CHNL 4	GFC 700	✓	GIA1/GFC 700 data path is functioning correctly.
		✗	GIA1/GFC 700 data path is not functioning correctly. • Load GIA1 configuration files, GIA Gains file and GSA software and gains file (if LRU and Card versions are different). Reference GFC section for further troubleshooting.
		?	GIA1/GFC 700 data path functionality is unknown. Reload GIA1 configuration files.

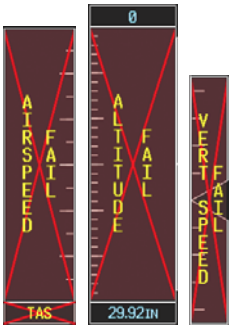
GIA2 RS-485

Channel	LRU	Indicator	Status
CHNL 1	GEA1		GIA2/GEA1 data path is functioning correctly.
			GIA2/GEA1 data path is not functioning correctly. • Verify GEA1 is powered on using the GEA Status page. • Load GIA2 and GEA1 configuration files. • Swap GIA2 and GIA1, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. o Replace original GIA2 if box turns to a green checkmark (√) after swapping units. • Swap GEA1 and GEA2, reconfigure both GEA's to their new locations to confirm if the problem is in the original GEA1. o Replace original GEA1 if box turns to a green checkmark (√) after swapping units. Check the GIA2/GEA1 interconnect wiring for faults.
			GIA2/GEA1 data path functionality is unknown. Reload GIA2 configuration files.
CHNL 2	GEA2		GIA2/GEA2 data path is functioning correctly.
			GIA2/GEA2 data path is not functioning correctly. • Verify GEA2 is powered on using the GEA Status page. • Load GIA2 and GEA2 configuration files. • Swap GIA2 and GIA1, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. o Replace original GIA2 if box turns to a green checkmark (√) after swapping units. • Swap GEA2 and GEA1, reconfigure both GEA's to their new locations to confirm if the problem is in the original GEA2. o Replace original GEA2 if box turns to a green checkmark (√) after swapping units. Check the GIA2/GEA2 interconnect wiring for faults.
			GIA2GEA2 data path functionality is unknown. Reload GIA2 configuration files.
CHNL 4	GFC 700		GIA2/GFC 700 data path is functioning correctly.
			GIA2/GFC 700 data path is not functioning correctly. • Load GIA2 configuration files, GIA Gains file and GSA software and gains file (if LRU and Card versions are different). Reference GFC section for further troubleshooting.
			GIA2/GFC 700 data path functionality is unknown. Reload GIA2 configuration files.

5.2.2 System Failure Troubleshooting

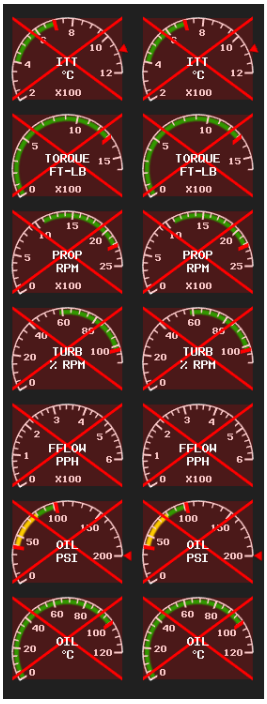
The following table provides basic troubleshooting guidance for LRU failures. Refer to G1000/GFC 700 Wiring Diagram, listed in Table 1-2, as needed to verify interconnects.

Invalid Data Field	Associated LRU(s)	Solution
Low Speed Awareness Band permanently displayed 	GDU	**NOTE** Reference Table 3-1 for interpretation of data indicator symbols • With aircraft weight on wheels and the G1000 in Configuration Mode, check that the RH GEAR ON GROUND Discrete In indication on GIA I/O CONFIGURATION page is VALID or TRUE. • If indication is VALID or TRUE, switch GIA1 and GIA2, to verify location of problem: ✓ If problem is resolved, replace defective unit. ✓ If indication is INVALID or FALSE, check for wiring faults between the GIAs and aircraft squat switch system.
Low Speed Awareness Band permanently inhibited	GDU	**NOTE** Reference Table 3-1 for interpretation of data indicator symbols • With aircraft weight off wheels and the G1000 in Configuration Mode, check that the RH GEAR ON GROUND Discrete In indication on GIA I/O CONFIGURATION page is INVALID or FALSE. • If indication is INVALID or FALSE, switch GIA1 and GIA2, to verify location of problem: ✓ If problem is resolved, replace unit. ✓ If indication is VALID or TRUE, check for wiring faults between the GIAs and aircraft squat switch system.
NAV1 & COM1 	GIA1	• Check configuration settings for GIA1 and PFD1. • Swap GIA1 and GIA2, to verify location of problem: ✓ If problem follows GIA1, replace GIA1. • Check Ethernet interconnect from GIA1 to PFD1. ✓ If problem persists, replace PFD.
NAV2 & COM2	GIA2	• Check configuration settings for GIA2 and PFD2. • Swap GIA1 and GIA2, to verify location of problem: ✓ If problem follows GIA2, replace GIA2. • Check Ethernet interconnect from GIA2 to PFD2. ✓ If problem persists, replace PFD.

Invalid Data Field	Associated LRU(s)	Solution
GPS LOI 	GIA1 or GIA2	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Check GPS1 and GPS2 signal strength on AUX page 4. Refer to GIA GPS section if GPS can not acquire a position lock for troubleshooting. • Check corresponding GPS antenna and cable for faults. • Check Ethernet interconnect between the PFD1 to GIA1 or PFD2 to GIA2 for faults. • Swap GIA1 and GIA2, to verify location of problem: ✓ If problem follows the GIA, replace the GIA. ✓ If problem persists, replace the PFD1 or PFD2.
XPDR FAIL 	GTX 33	• Check GTX 33 configuration settings for GIA1 and GIA2. • Check GTX 33/GIA1 interconnect. • Check GTX 33/GIA2 interconnect. • Perform a SET>ACTV configuration reset on the GTX Config page for each GTX, and verify the aircraft registration is present. • Replace GTX 33. ✓ If problem persists, replace GIA.
TAS FAIL AIRSPEED FAIL ALTITUDE FAIL VERT SPEED FAIL 	GDC 74B	✓ Inspect GDC 74B pitot/static plumbing integrity. ✓ Inspect pitot/static ports and associated equipment for faults. ✓ For TAS failure, also check GTP 59 probe. ✓ Check GDC 74B configuration settings for the PFDs, MFD, GIA1, and GIA2. 1. If PFDs, MFD, and GIA configuration settings are correct, replace the GDC configuration module. ✓ If problem persists, replace the GDC 74B.
OAT 	GTP 59	• Check OAT probe wiring and connectors for faults. • Check GDC config module wiring for damage, replace if any is found. • Replace GDC config module • Replace GDC 74B with a known good unit: ✓ If problem persists, replace the GTP 59.

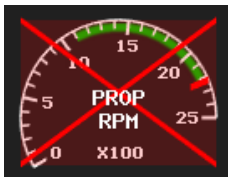
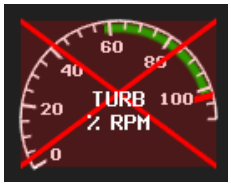
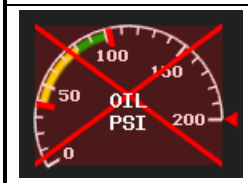
Invalid Data Field	Associated LRU(s)	Solution
ATTITUDE FAIL 	GRS 77	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Cycle GRS 77 power to restart initialization. • Ensure GRS 77 connecter is secure and proper wire harness strain relief is provided. • Ensure the GRS 77 is fastened down tightly in it's mounting rack and that the mounting rack is not loose (CAUTION - do not loosen the mounting rack hardware to the airframe shelf or the aircraft will need to be re-leveled and the PITCH/ROLL OFFSET procedure performed). • Ensure GPS has acquired at least four satellites, has a 3D navigation solution, and a DOP of less than 5.0. This is particularly important for an ATTITUDE FAIL that appears during ground operation only. • Perform an Engine Run-Up Test to check if engine vibration is causing the GRS 77 to go offline. • Load configuration files to the PFD, MFD, GIA1, and GIA2. • Calibrate the GRS 77 (Pitch/Roll Offset and Magnetometer Calibration). • Replace GRS 77. ✓ If problem persists replace GRS 77 configuration module. ✓ Contact Garmin Aviation Product Support if condition continues after replacing the GRS 77 and config module for additional assistance.

Invalid Data Field	Associated LRU(s)	Solution
HDG FAIL 	GRS 77 & GMU 44	• Ensure metal objects (tool boxes, power carts, etc.) are not interfering with the magnetometer and aircraft is not in hangar, near other buildings, parked over metal drainage culverts or on hard surfaces that may contain steel reinforcements • Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Cycle power after moving aircraft away from metal objects to determine if metal objects were the source of the interference. Allow up to five minutes for the heading to reinitialize. • Perform a Magnetometer Interference Test to check for interference from onboard electrical system components (e.g. NAV lights). Pay particular attention to any new electrical devices that have been installed since the aircraft was new. Correct any discrepancies that do not allow this test to pass before continuing. • Ensure GRS 77 and GMU 44 connectors are secure. • Check the wiring and any inline connectors between the GRS and GMU for faults. • Recalibrate the GMU 44, • Load configuration files to the PFD1, PFD2, GIA1, and GIA2 ✓ If problem persists replace the GMU 44. ✓ If problem persists, replace the GRS 77.
 	GRS 77 & GMU 44	• If this message persists longer than five minutes, perform AHRS calibration procedures as described in Section 7.7.3.

Invalid Data Field	Associated LRU(s)	Solution
Engine/Airframe Sensors (All Invalid)  	GEA 71 & GIA 63W	• If software was loaded to a new GDU display, be sure that the user settings for the replaced display were cleared. Clear user settings by pressing the CLR key on the replaced display while applying power to it. Acknowledge the on-screen prompt by pressing the ENT key or the right-most softkey. • Check for GEA related Alert messages on the PFD. Correct any Alerts concerning software or configuration errors by reloading software or configuration as noted. • Verify GEA internal power supply, configuration, and calibration status in configuration mode. ✓ The internal power supply, configuration and calibration boxes should be valid (green checkmark (√)). If they are invalid (red X), replace the GEA 71. • Verify internal, external, and reference voltages listed in the Main Analog and I/O A Analog boxes are not dashed out (does not include Aircraft Power 1 and 2). ✓ If any voltages are dashed out, replace the GEA. • Ensure the GEA is online (green checkmark on the AUX – SYSTEM STATUS page). ✓ If GEA is not online, verify unit is receiving power at the rack connector. ✓ Check the GIA/GEA interconnects for faults. ✓ Reload configuration files to both GIA's and the GEA. • If problem persists, replace the GEA 71.

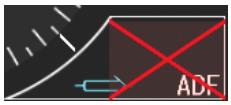
5.2.3 Engine/Airframe Instrument Failures

The following table provides guidance for troubleshooting individual engine/airframe sensor failures. Be sure to also follow previous guidance given for the GEA 71. The technician should troubleshoot to isolate the fault by checking sensor-to-GEA wiring, replacing the suspect sensor, and finally by replacing the GEA 71. Replace one part at a time. Refer to Section 7.4.1 to check for correct operation of the sensors and GEA 71 after any part has been replaced. Refer to G1000/GFC 700 Wiring Diagram and King Air Model 90 Series Maintenance Manual (listed in Table 1-2) as needed.

Invalid Field	Sensor	Possible Solutions (for applicable engine/system)
	ITT	• Check thermocouple cable. • Replace thermocouple cable. • Replace GEA 71.
	Torque	• Check torque transmitter interface wiring to GEA. • Check power input to torque transmitter. • Replace torque transmitter. • Replace GEA 71.
	Prop RPM	• Check prop tachometer - Signal Conditioner wiring. • Check Signal Conditioner interface wiring to GEA. • Check power input to Signal Conditioner. • Replace prop tachometer sensor. • Replace Signal Conditioner. Refer to Section 6.19. • Replace GEA 71.
	Turbine RPM	• Check engine speed tachometer - Signal Conditioner wiring. • Check Signal Conditioner interface wiring to GEA . • Check power input to Signal Conditioner. • Replace engine speed tachometer sensor. • Replace Signal Conditioner. Refer to Section 6.19. • Replace GEA 71.
	Fuel Flow	• Check fuel flow transmitter – Signal Conditioner wiring. • Check Signal Conditioner - GEA wiring. • Check power input to Signal Conditioner. • Replace fuel flow transmitter. • Replace Signal Conditioner. Refer to Section 6.20. • Replace GEA 71.
	Oil Pressure	• Check oil pressure sensor – GEA wiring. • Replace oil pressure sensor. • Replace GEA 71.
	Oil Temperature	• Check oil temperature sensor – GEA wiring. • Replace oil temperature sensor. • Replace GEA 71.

5.2.4 ADF/DME Failure

The PFD displays function as a control head for the remote-mounted Rockwell Collins ADF-60A and DME-42. A DME or ADF failure is represented by the following red X's. Refer to G1000/GFC 700 Wiring Diagram and King Air Model 90 Series Maintenance Manual (listed in Table 1-2) as needed.

Invalid Field	Sensor	Solutions
  	Rockwell Collins ADF	• Ensure that GIA 63 #2 is properly functioning. • Reload the ADF option configurations. • Check for proper operation of the ADF receiver. Ensure that the receiver is receiving power. • Check ADF – GIA2 interconnect. • For other failures of the ADF system, refer to King Air Model 90 Series Maintenance Manual, listed in Table 1-2.
 	Rockwell Collins DME	• Ensure that GIA 63 #1 is properly functioning. • Reload the DME option configurations. • Check for proper operation of the DME receiver. Ensure that the receiver is receiving power. • Check DME – GIA1 interconnect. • For other failures of the DME system, refer to the King Air Model 90 Series Maintenance Manual, listed in Table 1-2.

5.3 C90A/C90GT Specific Alerts

The following alerts are configured specifically for the C90A/C90GT:

ANNUNCIATION ADVISORY Alerts

Message Advisory	Solution
AVN 1 FAN FAIL – Avionics cooling fan #1 is inoperative.	• Ensure that the PFD/GIA FAN (LEFT and RIGHT) and MFD FAN circuit breakers are closed. • Check cooling fan wiring. Refer to G1000/GFC 700 Wiring Diagram, listed in Table 1-2. • Replace cooling fan. Refer to Sections 6.26 and 6.27.
AVN 2 FAN FAIL – Avionics cooling fan #2 is inoperative.	
PFD 1 FAN FAIL – PFD #1 cooling fan is inoperative.	
PFD 2 FAN FAIL – PFD #2 cooling fan is inoperative.	
MFD FAN FAIL – MFD cooling fan is inoperative.	

NOTE

From this point forward, all message advisory alerts presented are common to all G1000 systems and are not specific to the C90A/C90GT. Messages are grouped according to LRU.

5.4 TAWS Troubleshooting

Annunciation	Cause	Solution
TAWS FAIL	A TAWS system failure has occurred.	• If message occurred on the first power up after unlocking TAWS, cycle power to initialize TAWS. • Ensure each GDU contains the correct database data card. • Ensure the G1000 is configured for TAWS: ✓ If the system is not configured for TAWS, reconfigure per Section 3.9.6. • Verify GIAs are online. • Ensure a database or GDU SW mismatch has not occurred. ✓ If a mismatch has occurred, load correct database/software files or replace the terrain card.
TAWS TEST	TAWS system is currently being tested.	N/A – Test will be conducted up to two minutes
TAWS INHB	TAWS system alerting is disabled	Enable TAWS system alerting by pressing the INHIBIT softkey on the MAP – TAWS page.
TAWS N/A	GPS system integrity not high enough to enable TAWS	• Ensure valid GPS position is received from the AUX – GPS STATUS page. • Check GPS antenna & associated coaxial cabling. • Troubleshoot GIAs.

5.5 GFC 700 AFCS Troubleshooting

The GFC 700 is a digital Automatic Flight Control System (AFCS) which is integrated into various components of the G1000. This section touches upon key items to note while troubleshooting the GFC 700.

Should a problem be encountered during the operation of the GFC 700, the pilot and technician should first evaluate the overall status and condition of the G1000 system at the AUX – System Status page (on MFD). Any alert messages, annunciations, or other abnormal behaviors should be noted in an effort to pinpoint the fault. The object is to locate the fault within a LRU or LRUs in efforts to replace the defective equipment.

The GFC 700 AFCS Annunciation field is located above the airspeed tape on the PFD as shown:

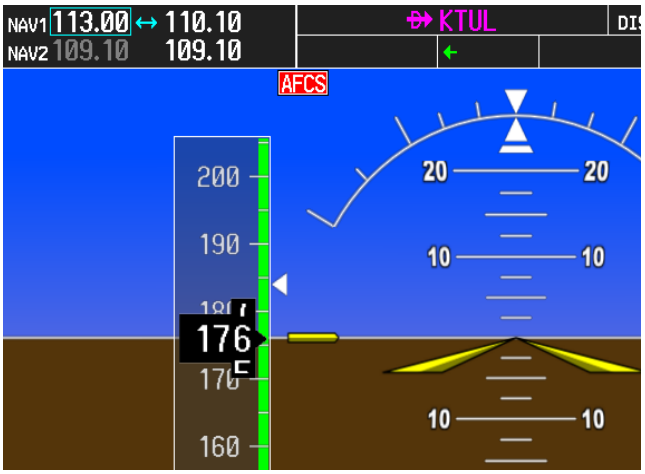


Figure 5-5. AFCS Annunciation Field

5.5.1 Synthetic Vision and Pathways Troubleshooting

The SVS/Pathways software feature requires the following G1000 sensors/data to be valid:

- AHRS
- Heading
- GPS Position
- 9 Arc-Second Terrain Data

In the event that one the above items fails or is unavailable, the SVS/Pathways feature is automatically removed from the PFD. The following table describes possible symptoms associated with the SVS/Pathways feature, and provides corresponding actions for troubleshooting:

Table 5-1. SVS Troubleshooting

Symptom	Recommended Action
"SYN VIS" softkey does not appear on PFD softkey tier.	Follow the steps in Section 3.9.11 to reactivate the SVS/Pathways feature.
3D terrain presentation does not appear on PFD.	Verify that P/N 010-00442-43 terrain datacards are installed in the lower slot of the PFD and MFD. Verify that the alert messages shown in Table 5-2 are not displayed on the PFD Alerts Window. If so, follow the solutions described in Table 5-2. Verify that the G1000 AHRS and heading data are valid on the PFD. Verify that a valid GPS 3D position solution is being received. Troubleshoot these systems in accordance with sections 5.9.4 and 5.14. If a terrain database update has just been performed, allow the system time to initialize and verify the data. When the databases have been verified, the current database cycle and version are reported on the MFD AUX – System Status page.

The following table provides SVS/Pathways specific alert messages which may appear in the Alerts Window on the PFD (press the ALERTS softkey on the PFD to view the Alerts Window):

Table 5-2. SVS-Related Alert Messages

Failure Message	Cause	Solution
SVS – SVS DISABLED: Out of available terrain region.	SVS is disabled because the aircraft exceeded the boundaries of the loaded terrain database.	Geographical operation limitations are defined in the AFMS listed in Table 1-2. Ensure that operations are within this geographic area.
SVS – SVS DISABLED: Terrain DB resolution too low	SVS is disabled because a 9 Arc-Second or better database is not currently loaded.	Ensure the P/N 010-00330-43 Terrain Cards are installed in the lower slot of each display. If terrain data has been recently updated, ensure that the correct 9 Arc-Second databases were used.

5.5.2 General Troubleshooting

The following annunciations may appear in the AFCS Annunciation field:

Table 5-3. AFCS Annunciation Troubleshooting

Annunciation	Condition	Resolution
AFCS	AFCS System Failure	• Confirm AFCS Servo circuit breaker IN • Ensure that the G1000 system is in proper working order. Check specifically for proper operation of the: ✓ GIA 63 Integrated Avionics Units ✓ GRS 77 AHRS Units ✓ GDC 74B Air Data Computers ✓ All GSA 80 and GSA 81 Servos • Check that no red X's are present on the MFD and PFD displays. • Check that no related alert messages are present on the PFD displays (press the ALERTS softkey). • Go to the AUX SYSTEM STATUS page on the MFD and verify that all LRUs have a 'green' check (see Section 5). • In Configuration mode, review the GFC 700 equipment status, software, and certification gains. • Reload software, configuration, and certification gains to the GIAs and GSA 80 and GSA 81 servos. • Check the GFC Status page for additional GFC 700 system information. • Review the fault and assert logs for the GIAs and servos (see Section 5.5.4) • Isolate the fault to an LRU. Replace this LRU and confirm the resolution of the annunciation.
PTCH	Pitch Axis Failure	• Check the AUX – SYSTEM STATUS page to see if the servo is online (green check). • Check that the affected servo is receiving power. • Check the servo wiring and connector. • For pitch trim, check pitch trim switch operation to verify switch contacts are not stuck. • If failure condition still exists, remove and replace the affected servo.
PTRM	Pitch Trim Axis Failure	
YAW	Yaw Axis Failure	
ROLL	Roll Axis Failure	
CHECK ATTITUDE	AHRS Monitor Failure	• If the AHRS inputs have been determined to be "unreasonable" while the AP is engaged, in air, this message will be displayed until AHRS inputs are determined reasonable for 5 seconds.
↓ELE	Elevator Mis-Trim Down	• If elevator mistrim annunciations persist, check the pitch and pitch trim servos for proper operation. Verify that the servo is online at the AUX – SYSTEM STATUS page. • Check the servo wiring and connectors. Ensure the servo is receiving power. • Check the aircraft control adjustments. • If mistrim condition still exists, remove and replace the affected servo.
↑ELE	Elevator Mis-Trim Up	

Annunciation	Condition	Resolution
	Aileron Mistrim Right	• Check for possible fuel imbalance. • Check aileron control adjustments. • If mistrim condition still exists remove and replace the roll servo.
	Aileron Mistrim Left	
	Rudder Mistrim Right	• Check rudder control adjustments. • If mistrim condition still exists remove and replace the yaw servo.
	Rudder Mistrim Left	
	Pre-Flight Test Fails	• Allow the system to complete pre-flight tests. • The preflight test should finish within 2 minutes. If it does not pass, the red 'PFT' annunciation is shown. In case of PFT failure, see Section 5.5.5 for additional PFT diagnostics.

Table 5-4. AFCS General Troubleshooting

Condition	Resolution
Poor AP Performance (Limited AP Authority)	• Check each servo mount slip clutch per Section 4.9. Verify the clutches are not excessively loose and are within torque limits. • Check aircraft controls for proper balancing and adjustment per the King Air Model 90 Series Maintenance Manual. • Check aircraft control cables for proper tension per the King Air Model 90 Series Maintenance Manual.
AP DISC Problems	• For intermittent nuisance disconnects with no AFCS of PFT alert, check A/P disconnect switch and wiring for intermittent faults. • If an AFCS or PFT alert is displayed at the time of the disconnect, troubleshoot per Section 5.5. • Check the GIA AFCS Fault Logs according to Section 5.5.4. If a **Mon Prmtr Invalid** message is received, check for valid true airspeed. A faulty GTP 59 OAT probe may cause TAS to become invalid, which will flag the **Mon Prmtr Invalid** message. • Contact Garmin Product Support for assistance
Loss of Manual Electric Trim	• Check pitch trim servo status. • Check MET switch discrete inputs to both GIAs by going to the GIA I/O Configuration page and selecting DISCRETE IN inputs.
AutoTrim Inoperative	• Check flap-in-motion discrete inputs to both GIAs for proper operation by going to the GIA I/O Configuration page and selected DISCRETE IN inputs. See Section 4.8. • If DATA indicator fails to illuminate or illuminates incorrectly, troubleshoot flap motor & discrete input wiring (refer to G1000/GFC 700 Wiring Diagram, listed in Table 1-2).

5.5.3 GFC Status Page

The GFC Status page is presented in configuration mode and gives status information regarding the GFC 700.

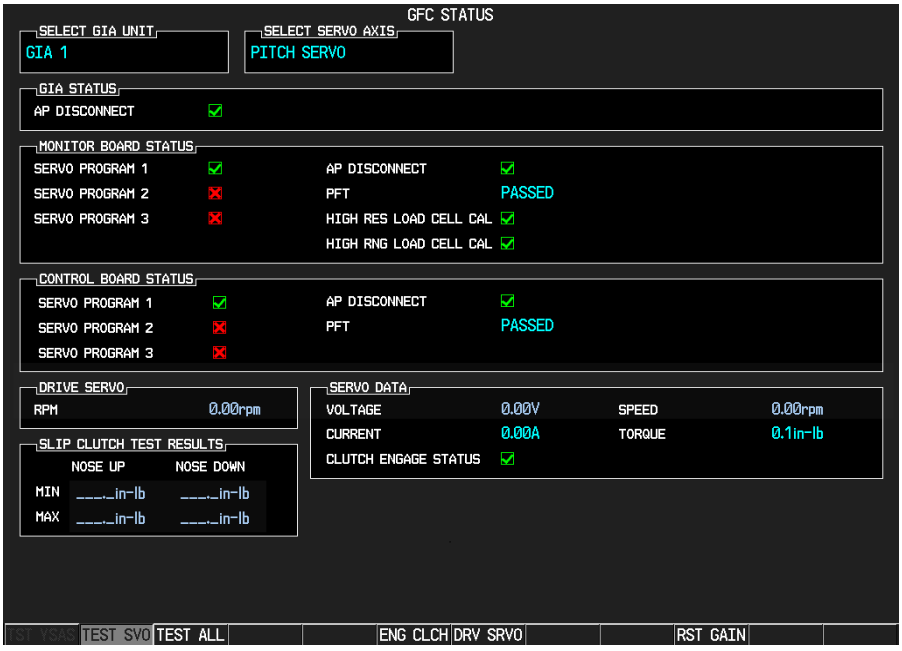


Figure 5-6. GFC Status Page

NOTE

Reference Table 3-1 for interpretation of data indicator symbols

GIA STATUS

AP DISCONNECT: Shows the condition of the AP DISC +28 VDC input to the GIAs and servos, which is required for the Autopilot to operate. A valid data indicator shows the AP DISC switch is closed and the GFC 700 is activly receiving 28. volts. An unkown indicator box indicates the GIAs and servos are no longer receiving the +28 VDC AP DISC power (switch open or other fault).

MONITOR/CONTROL BOARD STATUS

Shows the condition of various monitor board components.

SERVO PROGRAM (1-3): Servo program discretes are used to determine the HW strapping for each GSA to define the servo type. This information can be cross-referenced against the system interconnects to verify proper servo grounding.

AP DISCONNECT: Same as GIA Status.

PFT: Indicates whether the pre-flight test has passed or failed.

HIGH RES & HIGH RNG LOAD CELL CAL: Shows the condition of the high resolution and high range load cells on the monitor board. An invalid data indicator box indicates a corrupt or missing load cell calibration; return the servo to Garmin.

DRIVE SERVO

Allows the technician to enter a desired RPM at which to manually drive the selected servo. Direction of rotation is controlled by the polarity of the RPM (+ or -). After the speed is entered, the technician may use the ENG CLCH and DRV SRVO softkeys to drive the servo.

NOTE

Be especially certain that the flight controls are clear and safe to operate before manually driving the servo.

SERVO DATA

Shows real-time reported data including servo voltage, speed, motor current, load cell torque, and clutch solenoid status. A valid data indicator box indicates the servo clutch is engaged.

SLIP CLUTCH TEST RESULTS

This window is used during the automatic slip clutch torque measurement check.

IMPORTANT!

This automated clutch check method is NOT approved as an acceptable means of compliance with the annual slip clutch maintenance requirements in Section 4.9. The servo mounts MUST be removed from the aircraft to satisfy this requirement.

5.5.4 GIA Fault Log Descriptions

The section was created to help determine why the GFC 700 has failed the Pre-Flight Test indicated by the red PFT annunciation

, it defines the PFT sequence for the servos and the GFC 700 system and then provides troubleshooting information to help resolve failures.

There are 16 steps to the GFC 700 PFT. The PFT is performed by both GIA's at startup, and needs to pass on both GIA's before the autopilot can be engaged.

The PFT is only started if the AHRS has aligned, the GIA's and servos are configured and the certification gains are valid. If the PFT has not completed after one minute from when the initialization started, the PFT will fail. After the system PFT has passed, it will be performed again if a servo resets, if the autopilot servo breaker is reset or the cross side GIA restarts it.

Generally, the PFT failure fault is logged in the GIA Maintenance Log and not in the Servo Maintenance Logs unless the GIA log fault identifies a servo problem.

NOTE

Thoroughly understanding the operation of the G1000 system in Configuration mode is recommended before starting this procedure. The GFC Status page may be used to check the status of the servos and engage them to aid in troubleshooting

To access the GIA and GSA Maintenance Logs, perform the following steps –

1. Start the G1000 in Configuration mode.
2. Use the FMS knob on PFD1 to go to the Diagnostics Terminal page in the System group. This page allows the technician to view maintenance logs associated with the GFC 700.
3. Choose 'GIA 1' or 'GIA 2' in the LRU window.
4. In the SERVO window, choose 'NONE' to view the GIA Maintenance Log, or choose a servo to view their logs.
5. Using the FMS knob, choose 'VIEW MAINTENANCE LOG' in the COMMAND window.
6. Press the ENT key.
7. When the Maintenance Log data starts to display in the OUTPUT window, you may see "More...press any key to continue..." at the bottom of the OUTPUT window. This informs you

there is more data to display and the system has paused allowing you to view the data before continuing. To see more of the data, reselect the "VIEW MAINTENANCE LOG" in the COMMAND window and press the ENT key. The "...press any key to continue..." function is not active at this time.

8. Scroll through the OUTPUT list by pressing the OUTPUT softkey.

The GIA Maintenance Log can record any of the following faults:

- **FCS Task not started: Bad gains**

The FCS task has not started because the gains are not present or have been corrupted.

Reload the gain files to correct.

- **FCS Task not started: Gain structure out of range**

The FCS task has not started because the gains are not compatible with the GIA software.

Reload the gain files to correct.

- **PFT FAIL: Timeout, <STEP>**

Pre-flight test has failed because the specified step has not passed in the allotted time. See the GIA pre-flight steps for a description of the possible values for **<STEP>** on the failed GIA and corrective actions.

- **PFT FAIL: Cross GIA Failed, State: <STEP>**

Pre-flight test has failed on opposite GIA. **<STEP>** specifies the pre-flight test step on selected GIA that was in progress when the pre-flight test failed on the opposite GIA. See the GIA pre-flight steps for a description of the possible values for **<STEP>** on the failed GIA and corrective actions.

- **PFT FAIL: <STEP>**

Pre-flight has failed because the step specified has failed. See the GIA pre-flight test steps for a description of the possible values for **<STEP>** on the failed GIA and corrective actions.

- **AHRS MON invalid: <STATE>**

The AHRS monitor has detected that the AHRS data is invalid. The possible values for **<STATE>** are:

a. Mon Prmtr Invalid: The ARINC 429 data used by one of the monitors has not been received.

b. Attitude Prmtr Invalid: The ARINC 429 pitch or roll angle has not been received.

c. Exceeded Attitude Limits: The pitch or roll angle has exceeded the engagement limits.

d. Cross Hdg Accel Fail: Cross heading acceleration monitor failed.

e. Vert Accel Fail: Vertical acceleration monitor failed.

f. Fltrd Cross Hdg Accel Fail: Filtered cross heading acceleration monitor failed.

g. Fltrd Vert Accel Fail: Filtered vertical acceleration monitor failed.

h. Roll Accel Fail: Roll acceleration monitor has failed.

i. Normal Accel Fail: Normal acceleration has failed.

Troubleshoot the GRS 77 for the cause of the failure.

- **Stuck switch invalidated parameter: <AXIS>**

A MET switch in the specified axis is stuck.

Check the MET (trim) switches for proper operation.

- **PRMTR: <PARAMETER> MODE:<MODE> Parameter lost**

The mode specified by **<MODE>** has been disengaged because the parameter specified by **<PARAMETER>** has become invalid. The following is a list of some of the possible values for **<PARAMETER>:**

a. AD TDM Comm Valid: The specified mode has been disengaged because communication with the servos, via the Time Division Multiplexer protocol, has been lost.

b. AP Pitch MET not stuck: The specified mode has been disengaged due to a stuck pitch MET switch.

Check the MET (trim) switches for proper identification.

5.5.5 GIA Pre-Flight Test Steps

PFT Step 0: System initialization, verify GFC powered

This step is checking to make sure the GFC is powered up. It checks to make sure the GIA AP disconnect input is connected to 28 volts, and makes sure the Servos are up and communicating.

If this step fails, make sure the GIA is connected to AP disconnect by using the GFC configuration page. Also make sure all configured Servos are communicating by checking for Servo product data in configuration mode.

PFT Step 1: System initialization, verify GIA audio is valid.

This step is checking to make sure that the GIA audio region has been loaded and configured.

If this step fails, load GIA audio region and audio configuration.

PFT Step 2: System initialization, verify required servos are configured

This step is checking to make sure the current Servo configuration matches the Servo configuration specified in the certification gain file.

If this step fails, then make sure the Servo configuration on the GFC configuration page matches the Servo configuration specified in the configuration gain (.cgn) file.

PFT Step 3: System initialization, verify selected side

This step is checking to make sure the PFD1 is online and sending the selected AFCS side data over HSDB to GIA1.

If this step fails, then make sure the PFD is powered up and there is an Ethernet connection from the PFD to the GIA.

PFT Step 4: System initialization, verify AHRS monitor

This step is checking to make sure the AHRS monitor is valid and not reporting an AHRS failure. NOTE: AHRS monitor will be assumed valid if on the ground.

If this step fails, then make sure the AHRS and ADC is powered up and sending valid attitude data to the G1000.

PFT Step 5: System initialization, verify servo PFT is complete

This step is checking to make sure that all servos have completed their own PFT. This does not check whether the servo PFT passed or failed. It verifies that the servo PFT is no longer in progress.

PFT Step 6: Verify cross GIA is initialized

This step is checking to make sure the other GIA is also on step 6 of its PFT.

If this step fails, try cycling power on GIA1, GIA2, and all servos. If PFT still fails at step 6 then you will need to go check the PFT status of the other GIA and see what step it is failing (it should be prior to step 6). NOTE: The PFT status is communicated between GIA1 and GIA2 using HSDB. As a result, both the PFD and MFD must be powered for this state to pass.

PFT Step 7: Verify servo type

This step is checking to make sure the Servos are the correct type (80 or 81, high or low torque).

If this step fails, make sure the Servo configuration on the GFC configuration page matches the Servos installed in the aircraft.

PFT Step 8: Verify servo first certification data

This step is checking to make sure the servos have the same certification gains loaded in them as the GIAs have.

If this step fails, reload the certification gains in GIA1, GIA2, and all servos.

PFT Step 9: Verify servo second certification data

This step is checking to make sure the servos have the same certification gains loaded in them as the GIAs have.

If this step fails, reload the certification gains in GIA1, GIA2, and all servos.

PFT Step 10: Updating servo RTC

This step is setting the system time in the servos to by the same time as the GIA system time.

This step should never fail.

PFT Step 11: Verify servo PFT status

This step is checking to make sure the servos have all passed their own PFT.

If this step fails, please proceed to servo PFT explanation below.

PFT Step 12: Verify AP disconnect enabled

This step is checking to make sure GIA1, GIA2, and all servos have are connected to a 28 volt AP disconnect.

If this step fails, make sure the AP disconnect input to GIA1, GIA2, and all servos is connected and registering 28 volts. Make sure the AP disconnect switch has been installed in the aircraft. Make sure no one is holding the AP disconnect switch down on the yoke.

PFT Step 13: Verify servo validity

This step is checking to make sure all the Servos are up and communicating with valid data to the GIA in TDM mode.

If this step fails, then make sure all Servos are turned on and communicating by checking for green boxes on the GFC configuration page.

PFT Step 14: Verify cross GIA PFT is completed

This step is checking to make sure the other GIA is also on step 14 of its PFT.

If this step fails, try cycling power on GIA1, GIA2, and all servos. If PFT still fails at step 14 then you will need to go check the PFT status of the other GIA and see what step it is failing. NOTE: The PFT status is communicated between GIA1 and GIA2 using HSDB. As a result, both the PFD and MFD must be powered for this state to pass.

PFT Step 15: PFT completed

The PFT has successfully completed.

PFT Step 16: PFT failed

The PFT has failed.

5.5.5.1 Servo Faults and Troubleshooting

Whenever a servo fault occurs, a status message is logged to the corresponding servo control or monitor maintenance log. This information is also accompanied by a time and date stamp. An "RTC DATE" entry is made every time a servo is powered on, it is normally not useful for troubleshooting.

The following is a listing of possible faults that could be reported in a GSA fault log. Faults can occur in either the monitor board processor or the control board processor, both of which are contained in the GSA unit.

Monitor Processor

The monitor processor contains the logs that are found in these processors -

2 – Pitch Servo

4 – Roll Servo

6 - Yaw

8 – Pitch Trim Servo

There are two main groupings of faults that can occur in the monitor processor:

The first grouping of faults can occur during the GSA unit pre-flight test (PFT). If there is a fault during PFT the unit will not be able to transition to normal mode and the only way to clear this state would be to cycle unit power.

The second grouping of faults can occur during normal mode. These faults generally cause a disconnect of power to the GSA and report that a fault has occurred to the GIA.

The Notes column indicates any actions that can be taken to troubleshoot the problem in the aircraft by the technician. Any faults that are not listed here indicate an internal problem requiring replacement of the servo. If the items in the Notes column check out ok, replace the servo.

PFT Faults

MONITOR PFT STEP	NOTES
"INTERNAL COMM FAIL"	This can sometimes be a result of a failure on the other internal servo board, check faults on the other processor
"UNSW POWER INV"	Check unit power
"MON SOL PWR ON FAIL"	Check unit power and AP Disconnect power
"CTL SOL PWR ON FAIL"	Check unit power and AP Disconnect power
"SOL PWR FAIL"	Check unit power and AP Disconnect power
"CERT DATA UNINSTALLED"	Upload the certification gain file to the Monitor board
"STRAP CODE MISMATCH"	Check the connector strap inputs to the unit

Normal Mode Faults

MONITOR FAULT	NOTES
"GIA DIS FAULT"	Check the AP Disconnect power into the unit
"HOST DATA DIF"	Check the AHRS wiring to the system
"HOST DATA INV"	Check the AHRS wiring to the system
"SVO PWR INV"	Check unit power and AP Disconnect power
“STRP CODE CHNG”	Check the connector strap inputs to the unit
“MET STUCK SWTCH”	Check the MET switch inputs into the system
“MET STATUS DIF”	Check the MET switch inputs into the system

Control Processor

The control processor contains the logs that are found in these processors –

3 – Pitch Servo

5 – Roll Servo

7 - Yaw

9 – Pitch Trim Servo

There are two main groupings of faults that can occur in the control processor.

The first grouping of faults can occur during the GSA unit pre-flight test (PFT). If there is a fault during PFT the unit will not be able to transition to normal mode and the only way to clear this state would be to cycle unit power.

The second grouping of faults can occur during normal mode. These faults generally cause a disconnect of power to the GSA and report that a fault has occurred to the GIA.

The Notes column indicates any actions that can be taken to troubleshoot the problem in the aircraft by the technician. Any faults that are not listed here indicate an internal problem requiring replacement of the servo. If the items in the Notes column check out ok, replace the servo.

PFT Faults

CONTROL PFT STEP	NOTES
"INT COMM TEST FAIL"	This can sometimes be a result of a failure on the other board, check faults on other processor
"CTL MOT PWR ON FAIL"	Check unit power and AP Disconnect power
"MON MOT PWR ON FAIL"	Check unit power and AP Disconnect power
"HALL 1 FAIL"	Check unit power and AP Disconnect power
"HALL 2 FAIL"	Check unit power and AP Disconnect power
"HALL 3 FAIL"	Check unit power and AP Disconnect power
"HALL 4 FAIL"	Check unit power and AP Disconnect power
"HALL 5 FAIL"	Check unit power and AP Disconnect power
"HALL 6 FAIL"	Check unit power and AP Disconnect power
"CURR OFFST FAIL"	Check unit power and AP Disconnect power
"SVO TYPE FAIL"	Check unit power and AP Disconnect power
"CERT DATA UNINSTALLED"	Upload the certification gain file to the Control board
"STRAP CODE MISMATCH"	Check the connector strap inputs to the unit

Normal Mode Faults

CONTROL FAULT	NOTES
"GIA DIS FAULT"	Check the AP Disconnect power into the unit
"HOST DATA DIF"	Check the AHRS wiring to the system
"HOST DATA INV"	Check the AHRS wiring to the system
"SVO PWR INV"	Check unit power and AP Disconnect power
“STRP CODE CHNG”	Check the connector strap inputs to the unit
“MET STUCK SWTCH”	Check the MET switch inputs into the system
“MET STATUS DIF”	Check the MET switch inputs into the system

5.5.5.2 Downloading GIA and GSA Maintenance Logs

If additional assistance is needed troubleshooting autopilot faults, the Maintenance logs can be downloaded to an SD card as a text file (.txt) and emailed to Garmin Aviation Product Support. Please call Garmin Aviation Product Support before you send a Maintenance Log to notify them you are sending it to prevent a delay in response. You may download multiple GIA and GSA Maintenance Logs to the same file, however in your email to Garmin you must furnish the order in which they were downloaded (i.e. GIA1, then GIA2, then SRVO PTCH MON, then SRVO PTCH CTL, etc.).

1. Insert a FAT 32 formatted SD card into the top slot of the PFD before turning on the displays.
2. Power up PFD1/2 and MFD in the configuration mode.
3. On the PFD1 in the System page group, use the small FMS knob to scroll to the Diagnostics Terminal page.
4. Press the LG2CRD softkey at the bottom of the PFD1. Verify that the softkey text grays out. This indicates the recording function is active and all text that is displayed in the OUTPUT window will be saved to the card.
5. Enable the curser by pressing the FMS knob, select "GIA1" in the LRU drop down menu and then press the ENT key to select it.
6. Skip the SERVO box and move the cursor to the COMMAND box and select "View Maintenance Log" in the drop down menu then press the ENT key. The error log data will be displayed in the OUTPUT box. If you see the "more…press any key to continue" text at the bottom of the screen, you may need to reselect "View Maintenance Log" for GIA data to allow it to continue scrolling down the screen (pressing any key will not continue, disregard the text instruction you to do so). Continue to scroll through all the OUTPUT data until you see the text, "End of Fault Log".
7. Move the curser back to the LRU box, select "GIA2" in the LRU drop down menu and then press the ENT key to select it.
8. Skip the SERVO box and move the cursor to the COMMAND box and select "View Maintenance Log" in the drop down menu then press the ENT key. The error log data will be displayed in the OUTPUT box. If you see the "more…press any key to continue" text at the bottom of the screen, you may need to reselect "View Maintenance Log" for GIA data to allow it to continue scrolling down the screen (pressing any key will not continue, disregard the text instruction you to do so). Continue to scroll through all the OUTPUT data until you see the text, "End of Fault Log".
9. If you need to download Servo fault logs (usually done at the request of Garmin Product Support), perform the following steps. Otherwise, skip to step 10.
    a. In the LRU box, you may select either "GIA1" or "GIA2".
    b. In the SERVO box, choose a servo using the FMS knobs. Each servo contains two logs, one in the Monitor (MON) processor and one in the Control (CTL) processor. You must download both for each servo separately.
    c. In the COMMAND box, select "View Maintenance Log" and press the ENT key.
    d. The log will appear in the OUTPUT box. It will scroll to the end automatically. When it is complete, repeat steps a-c for the other servos in the aircraft. Be sure to note the order the servos were downloaded in including the Monitor or Control logs to email to Garmin Product Support. Without knowing the order in which the logs were downloaded, Garmin will be unable to process them and will ask for another full download.
10. Press the LG2CRD softkey to turn off the recording function.
11. Wait 1 minute for the system to save the data from the download to the SD card.

12. While you are waiting for the data to be saved to the SD card, record the order of the LRU's and/or Servos were downloaded so that you can provide that information to Cessna or Garmin to help decipher the order of the error data.
13. Power down the G1000 System and remove the SD card.
14. Insert the SD card in the card reader of a laptop or desktop computer and open the "diag_buf_log.txt" file from the SD card using the WordPad program. Verify that all of the fault logs were downloaded by checking for the "End of Fault Log" message at the end of the GIA data, and that the last servo log entry has the current date.
15. Insert the fault log as an attachment to an email and include the LRU order how the data was downloaded and send to Garmin Aviation Product Support at avionics@Garmin.com.

5.6 Backup Communications Path Checks

5.6.1 Overview

The G1000 system architecture is designed with redundant communication ports for several LRUs so that critical information can continue to be displayed in the event of an equipment or wiring failure. Of most importance is flight attitude, heading, and air data information. The GRS 77 and GDC 74B each have four separate ARINC 429 data lines that are all capable of sending data to the displays. The GEA 71, GTX 33, and GMA 1347D each have two redundant serial communication paths for the same purpose. See Figure 2-4 for a basic G1000 block diagram depicting this architecture. Several other diagrams are shown later in this section for illustrative purposes. When troubleshooting, refer to the G1000/GFC 700 Wiring Diagram listed in Table 1-2.

NOTE:

Refer to Section 8.1.6 for procedures on checking the status of each configured G1000 / GFC 700 backup data path.

5.6.2 Data Path Failures

Failure Message	Cause	Solutions
FAILED PATH – A data path has failed.	A communications data path status is not being received by the G1000.	Determine which data path has failed: See Section 8.1.6. Check wiring continuity for the failed path. Swap or replace the affected LRU.

5.7 GDU 104X Troubleshooting

5.7.1 GDU 104X Common Problems

Symptom	Recommended Action
Display is blank	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Cycle power. ✓ If GDU recovers, observe display for yellow text containing error information at the top of the screen. If message indicates software need to be re-loaded, then re-load software. Otherwise, replace the GDU.
Display resets	• Use a bright light to verify LCD is active. ✓ Adjust avionics dimmer control full clockwise. ✓ Manually turn up backlight on the PFD and load configuration files to the GDU. • Ensure slide lock is fully engaged with the locking tabs on the back of the unit. ✓ If slide lock is not fully engaged, remove connector and verify the locking tabs on the GDU are perpendicular to the connector. If necessary, straighten them before reseating connector. • Ensure GDU is receiving power. If a circuit breaker is tripped, determine source of short before resetting breaker. • Ensure circuit breakers have not failed and power wire connections are secure. • Swap PFD1 and PFD2. ✓ If problem follows unit, replace the display. Please note the position it failed in (PFD1/2). ✓ If problem does not follow unit, troubleshoot aircraft wiring for fault.
Display flickers	
SD card is stuck in GDU	• DO NOT insert a screwdriver of any length into the card slot. • DO NOT pry against the overlay. • DO NOT force the SD Card out. • Use a small screwdriver in the groove on the side of the exposed end of the card to help pull out the card. • Push the card in further to release the card locking mechanism. • Check SD Card for having more than one label. Two or more labels on the card will cause sticking. ✓ Remove all but one label. • Ensure the SD card is from Cactus or SanDisk. Use of other SD Cards is not recommended. • If card was inserted with the label facing to the right, do not attempt to remove. Return the unit to Garmin for repair.
A button/knob/joystick does not appear to function	• Go to the GDU TEST page in configuration mode and verify button, knob, or joystick operates correctly by observing a change in color from red to green in the button/knob/joystick icon when the button/knob/joystick is pressed. If a button is stuck, the button icon will be green without pressing the button as soon as you turn to the GDU TEST page. ✓ If problem is verified, replace GDU.

Symptom	Recommended Action
Terrain/Obstacle/Safetaxi does not display	• Ensure supplemental data cards are inserted correctly in the lower slots of all three GDU's. • Allow the system to verify the data on the cards for approximately five minutes after power-up. • If a database does not activate, reload the problem database onto the SD Card or replace the card.
Display will not track dimmer bus	• Reload GDU configuration files. • If display is a PFD, swap PFD1 and PFD2 to see if problem remains with display. ✓ Replace display if condition remains with the same unit. ✓ If condition remains in original position after swapping displays, check GDU dimmer input to verify voltage is present. • If display is the MFD, check dimmer input to verify voltage is present. ✓ Replace MFD if dimmer voltage is present.
Keyboard will not track dimmer bus	

5.8 GDU 104X Alerts

5.8.1 Software/Configuration Alerts

Failure Message	Cause	Solution
SW MISMATCH – GDU software version mismatch. Xtalk is off.	The system has found the PFDs and/or MFD software versions do not match.	• Load correct software version. See Section 3.9 for GDU 1040 Software Loading procedure.
MANIFEST – PFD 1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in the specified PFD.	
MANIFEST – PFD 2 software mismatch. Communication Halted.		
MANIFEST – MFD1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in MFD.	
CNFG MODULE – PFD 1 configuration module is inoperative.	The PFD master configuration module has failed.	• Check master configuration module connector and wiring for damage inside the GDU connector backshell. ✓ Replace master configuration module wiring and pins. ✓ If problem persists, replace master configuration module. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.

Failure Message	Cause	Solution
MFD1 CONFIG – MFD1 configuration error. Config service req'd.	A configuration mismatch has occurred between the display and the Master Configuration Module.	• Reload the display configuration files from SD Loader Card. • Reload system configuration files by pressing the UPDT CFG softkey on the Configuration Upload Page in the PFD1 System Page Group to load configuration files into the configuration module. ✓ If message persists, check PFD1 config module wiring for faults and replace if necessary. ✓ If issue continues, replace PFD1 master configuration module. ✓ If problem persists, replace the display. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
PFD 1 CONFIG – PFD 1 configuration error. Config service req'd.		
PFD 2 CONFIG – PFD 2 configuration error. Config service req'd.		

5.8.2 Database Alerts

Failure Message	Cause	Solution
MFD1 DB ERR – MFD1 aviation database error exists.	The MFD or specified PFD has encountered an error in the Jeppesen aviation database.	• Reload aviation database into the display. • Contact Garmin Technical Support for assistance.
PFD 1 DB ERR – PFD 1 aviation database error exists.		
PFD 2 DB ERR – PFD 2 aviation database error exists.		
MFD1 DB ERR – MFD1 terrain database error exists.	The MFD has encountered an error in the terrain database.	• Confirm supplemental data card is inserted fully. • Reload the database or replace the supplemental datacard. • Contact Garmin product Support for further assistance if needed.
PFD 1 DB ERR – PFD 1 terrain database error exists.	The specified PFD has encountered an error in the terrain database.	
PFD 2 DB ERR – PFD 2 terrain database error exists.		
MFD1 DB ERR – MFD1 obstacle database error exists.	The MFD has encountered an error in the obstacle database.	• Confirm supplemental data card is inserted fully. • Reload the database or replace the supplemental datacard. • Contact Garmin product Support for further assistance if needed.
PFD 1 DB ERR – PFD 1 obstacle database error exists.	The specified PFD has encountered an error in the obstacle database.	
PFD 2 DB ERR – PFD 2 obstacle database error exists.		
MFD1 DB ERR – MFD1 airport terrain database error exists.	The MFD has encountered an error in the airport terrain database.	• Confirm supplemental data card is inserted fully. • Reload the database or replace the supplemental datacard. • Contact Garmin product Support for further assistance if needed.
PFD 1 DB ERR – PFD 1 airport terrain database error exists.	The specified PFD has encountered an error in the airport terrain database.	
PFD 2 DB ERR – PFD 2 airport terrain database error exists.		
DB MISMATCH – Aviation database version mismatch. Xtalk is off.	The system has found the Jeppesen aviation database cycles in the PFDs and/or MFD do not match.	• Load current aviation database versions to all displays.
DB MISMATCH – Aviation database type mismatch. Xtalk is off.	The system has found the Jeppesen aviation database types in the PFDs and/or MFD do not match (i.e., different regions: Americas, International, Atlantic, etc)	• Load same type aviation database to all displays.

Failure Message	Cause	Solution
DB MISMATCH – Airport Terrain database version mismatch. Xtalk is off.	The PFDs and/or MFD have different Airport Terrain database versions installed.	• Confirm supplemental data card is inserted fully. • Reload the database or replace the supplemental datacard.
DB MISMATCH – Terrain database version mismatch.	The PFDs and/or MFD have different terrain database versions installed.	
DB MISMATCH – Obstacle database version mismatch.	The PFDs and/or MFD have different obstacle database versions installed.	
DB MISMATCH – Terrain database type mismatch.	The PFDs and/or MFD have different terrain database types installed (i.e., different regions: Americas, International, Atlantic, etc).	

5.8.3 Cooling Alerts

Failure Message	Cause	Solution
MFD1 COOLING – has poor cooling. Reducing power usage.	MFD1 has exceeded its operating temperature range.	• Check cooling fan and wiring for proper operation (if applicable). ✓ Replace cooling fan if unable to determine if operating correctly. ✓ If problem persists, replace the MFD. • If problem continues contact Garmin Aviation Product Support for assistance.
PFD 1 COOLING – has poor cooling. Reducing power usage.	PFD 1 has exceeded it's operating temperature range.	• Check cooling fan and wiring for proper operation (if applicable). ✓ Replace cooling fan if unable to determine if operating correctly. ✓ If problem persists, replace the PFD1. • If problem continues contact Garmin Aviation Product Support for assistance.
PFD 2 COOLING – has poor cooling. Reducing power usage.	PFD 2 has exceeded it's operating temperature range.	• Check cooling fan and wiring for proper operation (if applicable). ✓ Replace cooling fan if unable to determine if operating correctly. ✓ If problem persists, replace the PFD2. • If problem continues contact Garmin Aviation Product Support for assistance.

5.8.4 Key Alerts

Failure Message	Cause	Solution
MFD1 “key” KEYSTK – key is stuck.	The SYSTEM has determined a key is stuck on MFD1.	• Go to the GDU TEST page in configuration mode and verify key is stuck (if key is stuck the corresponding indicator will be green). • Exercise suspected stuck key and reset GDU TEST page to see if indicator remains green without pressing the key. ✓ If problem persists replace the display.
PFD 1 “key” KEYSTK – key is stuck.	The system has determined a key is stuck on the PFD 1.	
PFD 2 “key” KEYSTK – key is stuck.	The system has determined a key is stuck on the PFD 2.	

5.8.5 Miscellaneous Alerts

Failure Message	Cause	Solution
XTALK ERROR – A flight display cross talk error has occurred.	A communication error has occurred between the MFD and/or PFDs.	• Ensure a database error has not occurred (identified in the ALERTS window on the PFD). ✓ If a database error has occurred, correct error before proceeding. • Check display Ethernet interconnect wiring. • Replace PFD1 with a known good unit, to verify location of problem: ✓ If problem persists, reinstall original PFD1 and replace PFD2. ✓ If problem persists, reinstall PFD2 and replace MFD.
DATA LOST – Pilot stored data lost. Recheck settings.	Pilot stored data has been lost.	• If the CLR key was held during a power cycle, disregard message. • Cycle power to PFD1: ✓ Ensure CLR key is not stuck on the GDU TEST page. ✓ If problem persists, replace PFD1.

Failure Message	Cause	Solution
MFD1 SERVICE – needs service. Return unit for repair.	The G1000 has determined MFD1 needs service.	• Ensure the MFD connector is fully seated and locked. • If the unit was started in a very dark environment the photocells may not have enough light to initially raise the CCFT level. Go to the GDU STATUS page in configuration mode, ensure CCFT CRNT 1 & 2 levels are above 50. ✓ If the CCFT levels are not above 50, apply light to the photocell and observe if the CCFT level rises. ✓ If the CCFT level rises, disregard the message. ✓ If the CCFT level does not rise, replace the MFD • Replace the MFD
PFD 1 SERVICE – needs service. Return unit for repair.	The G1000 has determined the specified PFD needs service.	• Ensure the PFD connector is fully seated and locked. • If the unit was started in a very dark environment the photocells may not have enough light to initially raise the CCFT level. Go to the GDU STATUS page in configuration mode, ensure CCFT CRNT 1 & 2 levels are above 50. ✓ If the CCFT levels are not above 50, apply light to the photocell and observe if the CCFT level rises. ✓ If the CCFT level rises, disregard the message. ✓ If the CCFT level does not rise, replace the PFD • Replace the PFD.
PFD 2 SERVICE – needs service. Return unit for repair.		
PFD 1 VOLTAGE – PFD 1 has low voltage. Reducing power usage.	The specified PFD supply voltage is low.	• Check input voltage to PFD. • If input voltage is ok, replace PFD..
PFD 2 VOLTAGE – PFD 2 has low voltage. Reducing power usage.		
MFD1 VOLTAGE – MDF1 has low voltage. Reducing power usage.	The MFD supply voltage is low.	• Check input voltage to MFD. • If input voltage is ok, replace MFD.

5.8.6 GMA Common Problems

Symptom/Failure Message	Recommended Action
Noise in Audio	Most often the cause of the noise is external to the GMA. Try the following to locate the source of the noise before replacing the GMA: • Try a different pair of headsets. Noise cancelling headsets may pick up and/or generate more noise than standard headsets from their own circuitry. • Check for noise with the engine turned off. ✓ If the noise is present only when the engine is running, check the generator and/or ignition system as possible sources of noise (see applicable airframe specific maintenance manual). • Check for noise as all electrical equipment is turned on and off (strobes, other radios, etc.). ✓ If the noise is identified from one electrical system or component refer to the applicable airframe specific maintenance manual. • Ensure the NAV/COM squelch is not open. • Ensure the ADF and DME audio is not active. • Ensure the marker beacon audio is not active. • Ensure the ICS squelch is not open. ✓ Master squelch level can be adjusted on the GMA CONFIGURATION page for higher noise environments. • Replace unit only after all possible external sources of noise are eliminated.
Buttons Do Not Work.	• Some buttons are disabled in the GMA CONFIGURATION page by default. This is to remove potential sources of audio noise for inputs that are not used. If in doubt as to which buttons should be disabled, reload GMA config files and other config files for optional equipment installed in the aircraft (i.e. ADF, HF, etc.) from the loader card.
COM Bleedover	• Verify on the GMA CONFIGURATION page that “Disable Split COM” has a green box. Due to the closeness of the COM antennas and high power of the COM transceivers, Split COM operation is not approved. If the box is black (indicating COM ½ button is active), highlight “Disable Split COM” with the cursor and press the ENT key to turn the box green which will deactivate Split COM mode.
Speaker Cuts Out	• Reduce volume level of the item that caused the speaker to cut out when turned up. A speaker protection circuit disables the speaker output if the volume is too high. If the volume is not sufficient, replace aircraft cabin speaker, reference the Airframe Maintenance Manual.
Mic Audio Heard in Speaker	• Reduce ICS Volume.
GMA XTALK – GMA crosstalk error has occurred.	• Ensure both GMA units are receiving power. • Ensure both units are properly configured by verifying there are no GMA alert messages. • Check interconnect wiring between the GMA’s for faults. • Replace GMA1. • If problem persists, reinstall GMA1 and replace GMA2.

5.8.7 GMA Alerts

Failure Message	Cause	Solution
GMA1 SERVICE – GMA1 needs service. Return unit for repair. GMA2 SERVICE – GMA2 needs service. Return unit for repair.	The system has determined that the specified GMA 1347 needs service.	• Replace GMA .
GMA1 FAIL – GMA1 in inoperative. GMA2 FAIL – GMA2 in inoperative.	The system has detected a failure in the specified GMA 1347.	• Ensure GMA1 is receiving power. • Ensure both GIAs are receiving power. • Ensure all GDUs are receiving power. • Ensure the GMA/GIA RS-232 data lines are working properly. • Ensure the GIA/GDU Ethernet data lines are working properly. Replace GMA1.
MANIFEST – GMA1 software mismatch. Communication Halted. MANIFEST – GMA2 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in the specified GMA 1347.	Load the correct unit software. See Section 3.9 for the Software Loading procedure.
GMA1 CONFIG – GMA1 configuration error. Config service req'd. GMA2 CONFIG – GMA2 configuration error. Config service req'd.	The system has detected a GMA 1347D configuration mismatch for the specified unit.	• Load GMA configuration files, see Section 3.9. ✓ Replace GMA. ✓ If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.

5.9 GIA 63 Troubleshooting

5.9.1 COM

Symptom	Recommended Action
Weak COM transmit power	• Switch GIA1 and GIA2, to verify location of problem: ✓ If problem follows unit, replace GIA. ✓ If problem does not follow unit, check COM antenna and cabling for faults.
Weak COM receiver	• Switch GIA1 and GIA2, to verify location of problem: ✓ If problem follows unit, replace GIA. ✓ If problem does not follow unit, check COM antenna and cabling for faults.
No COM sidetone	• Switch GIA1 and GIA2, to verify location of problem: ✓ If problem follows unit, replace GIA. ✓ If problem persists, replace GMA1 with a known good unit. ✓ If problem persists, reinstall original GMA1 and replace GMA2.

5.9.2 NAV

Symptom	Recommended Action
Weak NAV receiver	• Set up a NAV/COM Ramp Test Set to radiate a test signal. • Switch GIA1 and GIA2, to verify location of problem: ✓ If problem follows unit, replace GIA. ✓ If problem does not follow unit, check NAV antenna, coupler, and cabling for faults.

5.9.3 G/S

Symptom	Recommended Action
Weak G/S receiver	• Set up a NAV/COM Ramp Test Set to radiate a test signal. • Switch GIA1 and GIA2, to verify location of problem: ✓ If problem follows unit, replace GIA. ✓ If problem does not follow unit, check NAV antenna, coupler, and cabling for faults.

5.9.4 GPS

Symptom	Recommended Action
Will Not Acquire Satellites	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Using the MFD AUX – GPS Status page, verify the signal strength bars are not erratic. If so, this indicates outside interference is affecting the GPS receivers. Find and remove the source of interference (i.e. cell phones, FBO datalink antennas, etc.). • Check date and time on Date/Time Setup Page. ✓ If date and time are incorrect, enter the correct date and time. • Switch GIA1 and GIA2, to verify location of problem: ✓ If problem follows unit, clear the GPS almanac by performing the following steps – o Using the PFD in config mode, go to the GIA RS-232/ARNIC 429 Config Page. o At the top of the screen, select the GIA that can not acquire satellites (GIA1 or GIA2) and press the ENT key. o Press the “CLR NV” softkey at the bottom of the screen. o Select “OK” in the “Clear GIA nonvolatile memory?” pop-up window. o Next reload GIA Audio and Config files from a loader card, see Section 4.3 and on for instructions. Be sure to reload the config files for any optional equipment installed on the aircraft that require the GIA config to be updated. • Cycle power on the system and allow it to restart in normal mode. Place the aircraft outside and allow 15-30 minutes for the GPS to acquire a position and download a new almanac. ✓ If clearing nonvolatile memory is unsuccessful and the GPS still can not acquire a position, replace the GIA. ✓ If problem does not follow unit, check GPS antenna and cabling.

5.10 GIA Alert Messages

5.10.1 COM Alerts

Failure Message	Cause	Solutions
COM1 SERVICE – COM1 needs service. Return unit for repair.	The system has determined COM1 needs service.	• Replace GIA1 according to instructions in Section 6.
COM2 SERVICE – COM2 needs service. Return unit for repair.	The system has determined COM2 needs service.	• Replace GIA2 according to instructions in Section 6.
COM1 PTT – COM1 push-to-talk key is stuck.	The COM1 external push-to-talk (PTT) switch is stuck in the enabled (or “pressed”) state.	• Press the push-to-talk switch(s) again to cycle its operation. • Check push-to-talk switch(s) and wiring. • Check GIA1/GMA 1347D #1 interconnect. • Switch GIA1 and GIA2, to identify whether the unit or connectors/wiring is at fault (Both GIAs must be configured when swapped; see Section 3.9): √ If problem follows the unit, replace GIA1. √ If problem persists replace defective GMA 1347D #1.
COM2 PTT – COM2 push-to-talk key is stuck.	The COM2 external push-to-talk (PTT) switch is stuck in the enabled (or “pressed”) state.	• Press the push-to-talk switch(s) again to cycle its operation. • Check push-to-talk switch(s) and wiring. • Check GIA2/GMA 1347D #2 interconnect. • Switch GIA1 and GIA2, to identify whether the unit or connectors/wiring is at fault (Both GIAs must be configured when swapped, see Section 3.9): √ If problem follows the unit, replace GIA2. √ If problem persists replace defective GMA 1347D #2.

Failure Message	Cause	Solutions
COM1 RMT XFR – COM1 remote transfer key is stuck.	The COM1 external remote transfer switch is stuck in the enabled (or “pressed”) state.	Press the COM1 external remote transfer switch again to cycle its operation. Check COM1 external remote transfer switch and wiring. Switch GIA1 and GIA2, to identify whether the unit or connectors/wiring is at fault (Both GIAs must be configured when swapped, see Section 3.9) √ If problem follows the unit, replace GIA1. √ If problem persists, continue to troubleshoot remote transfer switch & wiring.
COM2 RMT XFR – COM2 remote transfer key is stuck.	The COM2 external remote transfer switch is stuck in the enabled (or “pressed”) state.	Press the COM2 external remote transfer switch again to cycle its operation. Check COM2 external remote transfer switch and wiring. Switch GIA1 and GIA2, to identify whether the unit or connectors/wiring is at fault (Both GIAs must be configured when swapped, see Section 3.9): √ If problem follows the unit, replace GIA2. √ If problem persists, continue to troubleshoot remote transfer switch & wiring.
COM1 TEMP – COM1 over temp. Reducing transmitter power.	The specified COM transceiver is reporting a high temperature condition and is reducing transmit power to prevent damage.	• Check fan, wiring and air tubing for proper operation (if applicable). • Replace cooling fan if unable to determine if operating correctly. • Replace GIA. • If problem persists contact Garmin Aviation Product Support for assistance.
COM2 TEMP – COM2 over temp. Reducing transmitter power.		

5.10.2 NAV Alerts

Failure Message	Cause	Solution
NAV1 SERVICE – NAV1 needs service. Return unit for repair.	The system has detected a failure in NAV1 receiver.	• Replace GIA1.
NAV2 SERVICE – NAV2 needs service. Return unit for repair.	The system has detected a failure in NAV2 receiver.	• Replace GIA2.
NAV1 RMT XFR – NAV1 remote transfer key is stuck.	The NAV1 external remote transfer switch is stuck in the enabled (or “pressed”) state.	Press the NAV1 external remote transfer switch again to cycle its operation. Check NAV1 remote transfer switch and wiring. Switch GIA1 and GIA2, to identify whether the unit or connectors/wiring is at fault (Both GIAs must be configured when swapped, see Section 3.9): √ If problem follows unit, replace GIA1. √ If problem persists, continue to troubleshoot remote transfer switch & wiring.
NAV2 RMT XFR – NAV2 remote transfer key is stuck.	The NAV2 external remote transfer switch is stuck in the enabled (or “pressed”) state.	Press the NAV2 external remote transfer switch again to cycle its operation. Check NAV2 remote transfer switch and wiring. Switch GIA1 and GIA2, to identify whether the unit or connectors/wiring is at fault (Both GIAs must be configured when swapped, see Section 3.9): √ If problem follows unit, replace GIA1. √ If problem persists, continue to troubleshoot remote transfer switch & wiring.

5.10.3 Glideslope Alerts

Failure Message	Cause	Solution
G/S1 SERVICE – G/S1 needs service. Return unit for repair.	The system has detected a failure in G/S1 receiver.	• Replace GIA1.
G/S2 SERVICE – G/S2 needs service. Return unit for repair.	The system has detected a failure in G/S2 receiver.	• Replace GIA2.
G/S1 FAIL – G/S1 is inoperative.	The system has detected a failure in G/S1 receiver.	• Switch GIA1 and GIA2 to verify location of problem: √ If problem follows the unit, replace GIA. √ If problem does not follow unit, check G/S1 antenna and cabling.
G/S2 FAIL – G/S2 is inoperative.	The system has detected a failure in G/S2 receiver.	• Switch GIA1 and GIA2 to verify location of problem: √ If problem follows the unit, replace GIA. √ If problem does not follow unit,. check G/S2 antenna and cabling.

5.10.4 GPS Alerts

NOTE

Before troubleshooting, ensure that no cell phones or devices using cell phone technology are turned on, even in a monitoring state, in the cabin.

Failure Message	Cause	Solution
MANIFEST – GPS1 software mismatch. Communication halted.	The system has detected an incorrect software version loaded in GIA1.	• Load the correct GPS software. See Section 3.9 for the Software Loading procedure.
MANIFEST – GPS2 software mismatch. Communication halted.	The system has detected an incorrect software version loaded in GIA2.	
GPS1 SERVICE – GPS1 needs service. Return unit for repair.	The system has detected a failure in GPS1 receiver.	• Replace GIA.
GPS2 SERVICE – GPS2 needs service. Return unit for repair.	The system has detected a failure in GPS2 receiver.	
GPS1 FAIL – GPS1 is inoperative.	The system has detected a failure in GPS1 receiver.	• Switch GIA1 and GIA2, to verify location of problem: √ If problem follows the unit, replace GIA. √ If problem does not follow the unit, check GPS antenna and cabling.
GPS2 FAIL – GPS2 is inoperative.	The system has detected a failure in GPS2 receiver.	

Failure Message	Cause	Solution
LOI – GPS integrity lost. Crosscheck with other NAVS.	If the primary receiver is a WAAS sensor, the alert indicates that GPS position data has timed out.	• Verify the area the aircraft was traveling through did not have loss of GPS coverage. FAA NOTAMs may be issued for periods of outages, or the US Coast Guard website http://www.navcen.uscg.gov/gps/gpsnotices/default.htm will have notices posted. • Using the MFD AUX – GPS Status page, verify the signal strength bars are not erratic. If so, this indicates outside interference is affecting the GPS receivers. Find and remove the source of interference (i.e. cell phones, FBO datalink antennas, etc.). • If GPS receivers can not aquire a position lock, troubleshoot per the "Will not acquire satellites" section.
GPS NAV LOST – Loss of GPS navigation. Insufficient satellites.	There is no GPS position fix available or the system is in dead reckoning mode.	
GPS NAV LOST – Loss of GPS navigation. Position error.	The G1000 has detected an internal position warning has occurred.	
GPS NAV LOST – Loss of GPS navigation. GPS fail.	The G1000 has detected a GPS engine failure.	

5.10.5 GIA Cooling Alerts

Failure Message	Cause	Solution
GIA1 COOLING – GIA1 temperature too low.	GIA1 operating temperature is too low.	• Allow unit to warm up.
GIA2 COOLING – GIA2 temperature too low.	GIA2 operating temperature is too low.	• Allow unit to warm up.
GIA1 COOLING – GIA1 over temperature.	GIA1 has exceeded its operating temperature range.	• Check fan, wiring and air tubing for proper operation (if applicable). • Replace cooling fan if unable to determine if operating correctly. • Replace GIA1. • If problem persists contact Garmin Aviation Product Support for assistance.
GIA2 COOLING – GIA2 over temperature.	GIA2 has exceeded its operating temperature range.	• Check fan, wiring and air tubing for proper operation (if applicable). • Replace cooling fan if unable to determine if operating correctly. • Replace GIA2. • If problem persists contact Garmin Aviation Product Support for assistance.

5.10.6 GIA Configuration Alerts

Failure Message	Cause	Solution
MANIFEST – GIA1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GIA1.	• Load the correct software. See Section 3.9 for the Software Loading procedure.
MANIFEST – GIA2 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GIA2.	
GIA1 CONFIG – GIA1 audio config error. Config service req'd.	The GIA's audio configuration files are incorrect or missing.	• Reload audio configuration files.
GIA2 CONFIG – GIA2 audio config error. Config service req'd.		
GIA1 CONFIG – GIA1 configuration error. Config service req'd.	The system has detected a GIA configuration mismatch. If GIAs are not properly configured after being swapped/replaced, this message appears.	• Load the configuration files for that GIA. See Section 3.9 for GIA 63 Configuration Loading procedure. • If problem persists, replace master configuration module, check config module harness for faults and replace if necessary. **NOTE** • New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
GIA2 CONFIG – GIA2 configuration error. Config service req'd.		
HW MISMATCH – GIA hardware mismatch, GIA1 communication halted.	The G1000 has detected a non-WAAS GIA 63.	• Replace GIA with a WAAS unit.
HW MISMATCH – GIA hardware mismatch, GIA2 communication halted.		
GIA1 SERVICE – GIA1 needs service. Return unit for repair.	The G1000 has detected a failure in the specified GIA.	• Replace suspect GIA.
GIA2 SERVICE – GIA2 needs service. Return unit for repair.		

5.11 GEA Troubleshooting

5.11.1 GEA Alerts

Failure Message	Cause	Solution
MANIFEST – GEA1 software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the specified GEA 71.	Load the correct software verion. See Section 3.9 for GEA 71 Software Load Procedure.
MANIFEST – GEA2 software mismatch. Communication halted.		
GEA1 CONFIG – GEA1 configuration error. Config service req'd.	The system has detected a configuration mismatch in the specified GEA 71.	• Load GEA configuration files. See Section 3.9 for GEA 71 Configuration Procedure. • If problem persists, replace master configuration module, check config module harness for faults and replace if necessary. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
GEA1 CONFIG – GEA2 configuration error. Config service req'd.		

5.12 GTX Troubleshooting

5.12.1 GTX Alerts

Failure Message	Cause	Solutions
MANIFEST – GTX1 software mismatch. Communication halted. MANIFEST – GTX2 software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the specified GTX 33.	• Reload software. See Section 3.9 for the Software Load Procedure.
XPDR1 CONFIG – XPDR1 configuration error. Config service req'd. XPDR2 CONFIG – XPDR2 configuration error. Config service req'd.	The system has detected a configuration mismatch for the specified GTX 33.	• Perform a SET>ACTV configuration reset on the GTX Config page and verify the aircraft registration is present. • If error is still present, reload config files from a loader card. √ If problem persists, replace master configuration module, check config module harness for faults and replace if necessary. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
XPDR1 SRVC – XPDR1 needs service. Return unit for repair. XPDR2 SRVC – XPDR2 needs service. Return unit for repair.	The G1000 has detected a failure in the specified GTX 33.	• Replace GTX 33.
XPDR1 FAIL – XPDR 1 is inoperative. XPDR2 FAIL – XPDR 2 is inoperative.	The specified GTX 33 is not responding.	• Check wiring between GIA's and GTX. • Replace GTX 33.

5.13 GDL 69A Troubleshooting

5.13.1 GDL 69A Common Problems

Symptom	Recommended Action
No XM audio is heard No XM weather information is displayed	• Ensure the following items are not preventing the audio panel from distributing XM audio (reference applicable G1000 Pilot's Guide): √ Verify the XM volume is not muted on the AUX – XM RADIO page on the MFD. √ Verify the COM squelch is not open. √ Verify the ICS squelch is not open. √ Verify the marker beacon tones are not being received. √ Verify the headphone (if equipped) volume is turned up. • Go to the AUX – SYSTEM STATUS page on the MFD and ensure unit is online. √ If a red X is present, verify the unit is receiving power at the rack connector. • Ensure there are no GDL alerts in the alert window. If there is an Alert for software or configuration error or mismatch, reload the file noted in the Alert. • Restart the PFD's and MFD in configuration mode and go to the GDL page. √ Verify unit is active. √ Verify the Signal number is "2" or "3". If it is "0" or "1" check the GDL 69/69A antenna and cabling for faults. √ Reseat the GDL 69/69A to verify the coax connector is fully seated. √ If unit is not active, contact XM Customer service at 1-800-985-9200 to have a refresh signal sent to your unit. You will need to provide them the Audio Radio ID (and Data Radio ID number for XM weather) numbers. Also verify with XM that the correct Weather package (Aviator Lite or Aviator) is on the account, and that no traffic service has been activated against that Radio ID. The unit must be on for approximately one hour after the request for the refresh has been sent to receive the signal. √ Alternatively, you may also go to XM's website at http://www.xmradio.com/refresh/ and enter the radio ID's to have a refresh signal sent. √ If there is still problems receiving weather products after performing the above step, call XM and have the account deactivated, and a new account activated to clear out any corrupt account information. √ Verify there is a good ground connection through the aircraft between the MFD and the GDL69/69A unit. Reference the Aircraft Maintenance Manual for instructions on how to check bonding and ground points. √ If problem persists, replace the GDL 69/69A.

5.13.2 GDL 69A Alerts

Failure Message	Cause	Solutions
GDL 69 FAIL – GDL 69 has failed.	The G1000 has detected a failure in the GDL 69A.	• Replace GDL 69A. • Check GDL 69A antenna and cabling. • Check the GDL 69A and MFD interconnect.
GDL69 CONFIG – GDL 69 configuration error. Config service req'd.	The G1000 has detected a GDL 69A configuration mismatch.	• Reload configuration file. See Section 3.9 for the Configuration Procedure. • If problem persists, replace master configuration module, check config module harness for faults and replace if necessary. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
MANIFEST – GDL software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the GDL 69A.	• Load correct software version. See Section 3.9 for the Software Load Procedure.

5.14 GRS 77/GMU 44 Troubleshooting

5.14.1 AHRS Common Problems

Symptom	Recommended Action

AHRS does not complete initialization	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin.
	• Ensure GPS has acquired at least four satellites, has a 3D navigation solution, and a DOP of less than 5.0. This is particularly important if this issue appears during ground operation only.
	• Calibrate the GRS 77.
	• Check GRS 77 configuration module wiring for damage.
	• Check GRS 77 connector for bent pins.
	  • If no damage can be found, replace GRS 77 configuration module.
	  • If problem persists, replace the GRS 77.

Attitude appears unstable	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Ensure the four GRS 77 mounting screws are tight. Finger tight is not sufficient, a screwdriver must be used to verify. • Ensure mounting rack and airframe shelf are secure and all hardware and brackets are present (CAUTION - do not loosen the mounting rack hardware to the airframe shelf or the aircraft will need to be re-leveled and the PITCH/ROLL OFFSET procedure performed).. • Ensure GRS 77 connector is securely fastened and proper strain relief is provided. • Remove GRS 77 connector and verify there are no bent pins. • Replace the GRS 77. • Contact Garmin for further troubleshooting if required.

5.14.2 GRS Alerts

Failure Message	Cause	Solutions
MANIFEST – GRS1 software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the specified GRS 77.	• Load correct software version. See Section 3.9 for the Software Load Procedure.
MANIFEST – GRS2 software mismatch. Communication halted.		
AHRS1 SERVICE – AHRS1 magnetic-field model needs update.	The AHRS magnetic field model should be updated for the specified unit. Appears on ground only.	• Load updated AHRS magnetic field file. See Section 4.6.
AHRS2 SERVICE – AHRS2 magnetic-field model needs update.		
GEO LIMITS – AHRS1 too far north/south, no magnetic compass.	No magnetic compass information available due to being too far north or south.	• Operate the aircraft only within the limits as specified in the G1000/GFC 700, King Air C90A/C90GT AFMS, listed in Table 1-3
GEO LIMITS – AHRS2 too far north/south, no magnetic compass.		
AHRS1 TAS – AHRS1 not receiving airspeed.	The specified GRS 77 is not receiving airspeed from the GDC 74A.	• Check GRS/GDC interconnect for faults. • Replace the GDC 74: • If problem persists, replace the GRS 77.
AHRS2 TAS – AHRS2 not receiving airspeed.		
AHRS1 GPS – AHRS1 not receiving backup GPS information.	The GRS 77 #1 is not receiving backup GPS information from either GIA 63.	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Check GPS status for GIA 1 and 2 on MFD - AUX GPS STATUS page. If one or both GPS receivers cannot acquire a position lock, see GPS troubleshooting section • Troubleshoot GIA1/2 –GRS1 wiring for faults (ref. Failed Path troubleshooting section). • Replace the GRS 77 #1.
AHRS1 GPS – AHRS1 operating exclusively in no-GPS mode.	The GRS 77 #1 is operating in the absence of GPS.	
AHRS1 GPS – AHRS1 not receiving any GPS information.	The GRS 77 #1 is not receiving GPS data from the GPS receivers.	
AHRS1 GPS – AHRS1 using backup GPS source.	The GRS 77 #1 is using the backup GPS data path.	
AHRS2 GPS – AHRS2 not receiving backup GPS information.	The GRS 77 #2 is not receiving backup GPS information from either GIA 63.	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Check GPS status for GIA 1 and 2 on MFD - AUX GPS STATUS page. If one or both GPS receivers cannot acquire a position lock, see GPS troubleshooting section • Troubleshoot GIA1/2 –GRS2 wiring for faults (ref. Failed Path troubleshooting section). • Replace the GRS 77 #2
AHRS2 GPS – AHRS2 operating exclusively in no-GPS mode.	The GRS 77 #2 is operating in the absence of GPS.	
AHRS2 GPS – AHRS2 not receiving any GPS information.	The GRS 77 #2 is not receiving GPS data from the GPS receivers.	
AHRS2 GPS – AHRS2 using backup GPS source.	The GRS 77 #2 is using the backup GPS data path.	
AHRS MAG DB – AHRS magnetic model database version mismatch.	The G1000 has detected a magnetic model database version mismatch.	• Load AHRS magnetic model field in both GRS units.

Failure Message	Cause	Solutions
MAG VAR WARN – Large magnetic variance. Verify all course angles.	Magnetic variance value from GMU 44 is not accurate.	• If flying near large radio towers or other sources of possible electromagnetic interference, the condition should correct itself as the aircraft leaves the area. • If problem persists, run magnetic interference check in Section 5.14.4 to check for magnetic interference in the aircraft.

5.14.3 GMU Alerts

Failure Message	Cause	Solutions
MANIFEST – GMU1 software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the specified GMU 44.	Load the correct software version. See Section 3.9 for the Software Load Procedure.
MANIFEST – GMU2 software mismatch. Communication halted.		
HDG FAULT – AHRS1 magnetometer fault has occurred	A fault has occurred in the specified magnetometer; heading will be flagged invalid.	• Check GMU 44/GRS 77 interconnect for faults. ✓ Replace GMU 44. ✓ If problem persists, replace GRS 77.
HDG FAULT – AHRS2 magnetometer fault has occurred.		

5.14.4 Calibration Procedure E: Magnetometer Interference Test

A magnetometer interference test is available for troubleshooting and/or verifying a magnetically 'clean' installation of the GMU 44. This test exercises various devices on the aircraft that could potentially affect the magnetic field as measured by the GMU 44 (examples include navigation lights, control servos, landing gear motors, etc).

NOTE

This test is used to validate that no electronic device interferes with the operation of the GMU 44 magnetometer. It is highly recommended that this test be performed after installation or maintenance of electrical components on the aircraft and/or for troubleshooting the GMU 44.

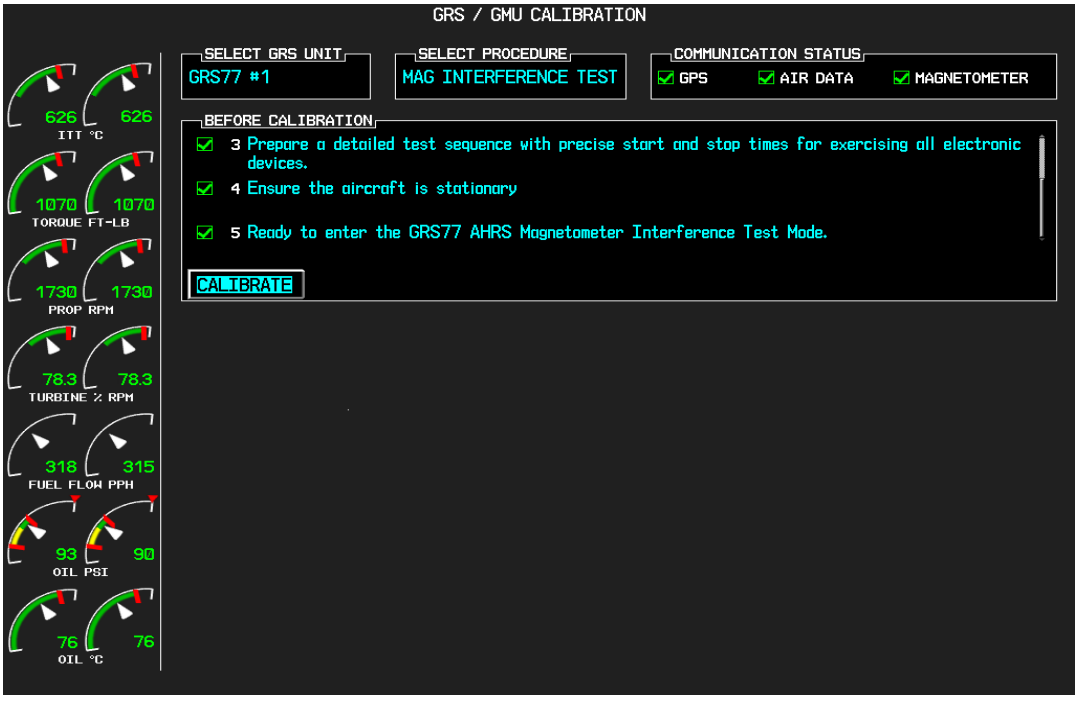


Figure 5-7. Magnetometer Interference Test

1. Initiate the AHRS magnetometer interference test procedure by performing the following steps:

2. Enter Configuration Mode and go to GRS/GMU Calibration page as shown in Figure 5-6.

3. This page is protected and requires a keystroke password to perform this test. Press the following softkeys in sequence:

    i) softkey 9

    ii) softkey 10

    iii) softkey 11

    iv) softkey 12

4. Select MAG INTERFERENCE TEST and press the ENT key.

5. Follow the checklist items displayed on the PFD, and press the ENT key as each one is completed or confirmed.

NOTE

The 3rd item on the checklist instructs the operator to "prepare a detailed test sequence with precise start and stop times for exercising all electronic devices". The list of relevant electronic devices are given in Table 5-5. Begin test with flaps retracted, flight controls in a neutral position and all lights selected OFF.

Table 5-5. Magnetometer Interference Test Sequence (Example)

Elapsed Time since Start of Test (min:secs)	Action
0:00	Test begins
0:10	Navigation lights on
0:20	Navigation lights off
0:30	Landing lights on
0:40	Landing lights off
0:50	Taxi lights on
1:00	Taxi lights off
1:20	Strobes on
1:40	Strobes off
1:50	Recognition lights on
2:00	Recognition lights off
2:10	Beacon on
2:20	Beacon off
2:30	Rudder full left
2:40	Rudder full right
2:50	Elevator full nose UP
3:00	Elevator full nose DN
3:10	End of test

6. When the CALIBRATE field is blinking, press the ENT key to begin the procedure, and have a stopwatch ready to begin recording the elapsed time.

NOTE

It is important that the "time equals zero" moment corresponds with the moment the PFD first displays the blinking TEST COMPLETE? message.

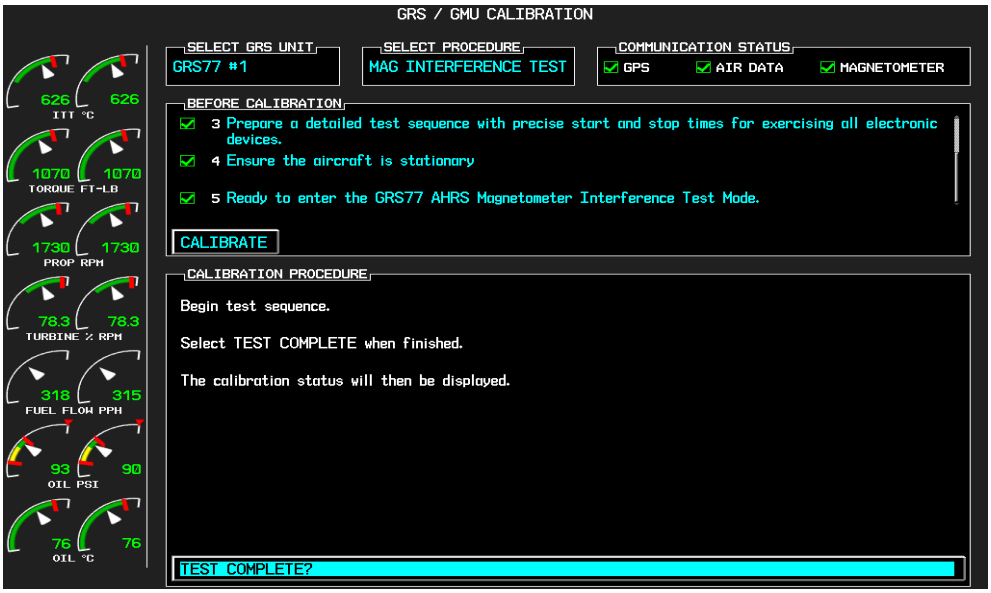


Figure 5-8. Magnetometer Interference Test Complete

7. The operator should carry out the actions called for in the prepared test sequence.

NOTE

It is important that all actions are carried out in the order and at the precise elapsed time as specified in the prepared test sequence.

8. When the operator has completed the actions specified in the test sequence, press the ENTER button to indicate that the process is complete. When this is done, the TEST COMPLETE field stops blinking.

9. The PFD informs the operator if the installation has passed or failed the magnetometer interference test. If the test passes, no further action is required for this test.

   If the test fails, the installation should be considered unreliable until the source of magnetic interference is identified and remedied. When the magnetometer interference test fails, record the three magnetometer maximum deviation values and their corresponding timestamps. Any maximum deviation value greater than 2.5 milliGauss indicates a problem that must be resolved. Compare the corresponding timestamps with the prepared test sequence to identify which action produced the problem. Contact Garmin for assistance in resolving the problem.

NOTE

Two common reasons for a failed magnetometer interference test are: 1) new equipment is installed in close proximity to the GMU 44 magnetometer, and 2) an existing or new electronic device has become grounded through the aircraft structure instead of via the proper ground wire in a twisted shielded pair.

10. Press the ENT key on the PFD to conclude this procedure.

5.15 GDC 74B Troubleshooting

5.15.1 Air Data Common Problems

Symptom	Recommended Action
Altitude is different than standby altimeter	• Perform a pitot/static check per Section 7.6 of this manual. Allow the GDC to warm up for fifteen minutes before checking accuracy, per Garmin Service Advisory 0606. • Determine which instrument is outside limits and replace. The GDC may be field adjusted per Garmin Service Advisory 0720. Note: Both units may individually be in spec but show a difference in altitude. Do not return the GDC to Garmin for service if not outside limits.
GDC Config file does not load.	• Replace GDC config module. √ If problem persists, replace GDC config module wire harness.

5.15.2 GDC 74B Alerts

Failure Message	Cause	Solutions
MANIFEST – GDC1 software mismatch Communication halted.	The system has detected an incorrect software version loaded in the specified GDC 74B.	• Load correct software version. See Section 3.9 for the Software Load Procedure.
MANIFEST – GDC2 software mismatch Communication halted.		

5.16 GWX 68 Troubleshooting

5.16.1 GWX 68 Alerts and Problems

WARNING:

Before energizing the equipment, be sure microwave radiation safety precautions including both fuel and personnel safety considerations have been observed. These include clearing all personnel to an area beyond the maximum permissible exposure level (MPEL) boundary. The MPEL for the GWX 68 is 11 feet.

Failure Message	Cause	Solutions
GWX CONFIG – GWX configuration error. Configuration service required.	The G1000 has detected a GWX 68 configuration mismatch.	• Load GWX configuration files, √ Replace GWX. √ If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
GWX FAIL – GWX is inoperative.	The G1000 has detected a failure in the GWX 68.	• Check Ethernet connection between the GWX and GDL69A for faults. • Replace the GWX 68
GWX SERVICE – Needs service. Return unit for repair.	The G1000 has detected a failure in GWX 68.	• Replace the GWX 68.
MANIFEST – GWX software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the GWX 68.	• Load correct software version. See Section 3.9 for the Software Load Procedure.

5.17 GMC 710 Troubleshooting

5.17.1 GMC 710 Alerts and Problems

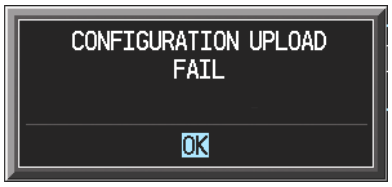
Failure Message	Cause	Solutions
GMC CNFG – GMC Config error. Config service req'd.	The G1000 has detected a GMC 710 configuration mismatch.	• Load GMC configuration files, √ Replace GMC. √ If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
GMC FAIL – GMC is inoperative.	The G1000 has detected a failure in the GMC 710.	• Check wiring for faults (ref Failed Path troubleshooting section). • Replace the GMC 710.
MANIFEST – GMC software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the GMC 710.	• Load the correct software version. See Section 3.9 for the Software Load Procedure.

5.18 GCU 475 Troubleshooting

5.18.1 GCU 475 Alerts and Problems

Failure Message	Cause	Solutions
GCU CNFG – GCU Config error. Config service req'd.	The G1000 has detected a GCU 475 configuration mismatch.	• Load GCU configuration files, √ Replace GCU. √ If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary. **NOTE** New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
GCU FAIL – GCU is inoperative.	The G1000 has detected a failure in the GCU 475.	• Check wiring for faults (ref Failed Path troubleshooting section). • Replace the GCU 475.
MANIFEST – GCU software mismatch. Communication halted.	The system has detected an incorrect software version loaded in GCU 475.	• Load the correct software version. See Section 3.9 for the Software Load Procedure.

5.19 Software/Configuration Troubleshooting

Problem	Solutions
MFD or PFD displays do not power up:	• Ensure that the criteria listed in Section 5.19.1 are fulfilled for the applicable situation. • Ensure power is present at display backshell connector. • Troubleshoot per the “Blank Display” GDU section..
Software file load fails: 	• Ensure that criteria listed in Section 5.19.1 are fulfilled for the applicable situation. • Ensure that LRU is reporting data on System Status page (LRU is ‘ONLINE’). Check data path wiring as needed. • Retry software file load or try using a different card. Ensure that the MFD is not touched during the loading process. • Ensure that LRU part number is compatible with software version and Card Loader. Refer to the General Arrangement Drawing and to Section 3.8 of this document. • Replace LRU.
Configuration file load fails: 	• Ensure that the criteria listed in Section 5.19.1 are fulfilled for the applicable situation. • Ensure that LRU is reporting data on System Status page (LRU is ‘ONLINE’). Check data path wiring as needed. • Retry configuration file load or try using a different card. Ensure that the MFD is not touched during the loading process. • Ensure that LRU part number is compatible with Card Loader. Refer to the General Arrangement Drawing and to Section 3.8 of this document. • Replace LRU.
GIA1 and/or GIA2 to ‘LRU’ data path not working	• Ensure that the criteria listed in Section 5.19.1 are fulfilled for the applicable situation. • Ensure GIA1 and GIA2 are configured correctly. • Check wiring, connectors & pins as needed.
Software File Mismatch Alert appears in lower right corner of PFD when started in normal mode: 	• Ensure that proper software file part number and version were loaded to LRU. Refer to the General Arrangement Drawing and to Section 5.19.1. • Check and ensure that correct Card Loader was used during load process. Refer to the General Arrangement Drawing. • Reload software to LRU.

5.19.1 System Communication Hierarchy

The following criteria must be satisfied to be able to perform the desired operation:

Desired Operation	Criteria for Success
Load Software to MFD or PFD Displays	• G1000/C90 SW Loader Card must be inserted in top slot for each display to be loaded. • CLR & ENT keys must be held during power up of display. • Power on only one display at a time during software loading.
Load AIRFRAME, SYSTEM, MFD1, PFD 1, PFD 2 and MANIFEST configuration files to MFD and PFDs	• G1000/C90 SW Loader Card must be inserted in top slot of PFD 1. • PFD 1 and MFD must be powered on. • PFD 1 and MFD must have correct software.
Load Software/Configuration files to GIA 63Ws	• G1000/C90 SW Loader Card must be inserted in top slot of PFD 1. • G1000 system must be powered on. • PFD and MFD must have correct software. • PFD 1 and MFD must be successfully configured with AIRFRAME, SYSTEM, MANIFEST, MFD1, PFD 1 and PFD 2 configuration files.
Load Software/Configuration files to: - GMA 1347D - GDC 74B - GEA 71 - GRS 77 (software only) - GMU 44 (software only) - GTX 33( )	• G1000/C90 SW Loader Card must be inserted into PFD 1 top slot. • G1000 must be powered on. • PFD 1 and MFD must have correct software and configuration settings. • GIA 63Ws must have correct software. • GIA 63Ws must be successfully configured with GIA1 and GIA2 configuration files. • Data path from GIA1 to each LRU must be operational.

5.20 Backshell Connectors

The following figures depict the backshell connectors as viewed with the LRU removed.

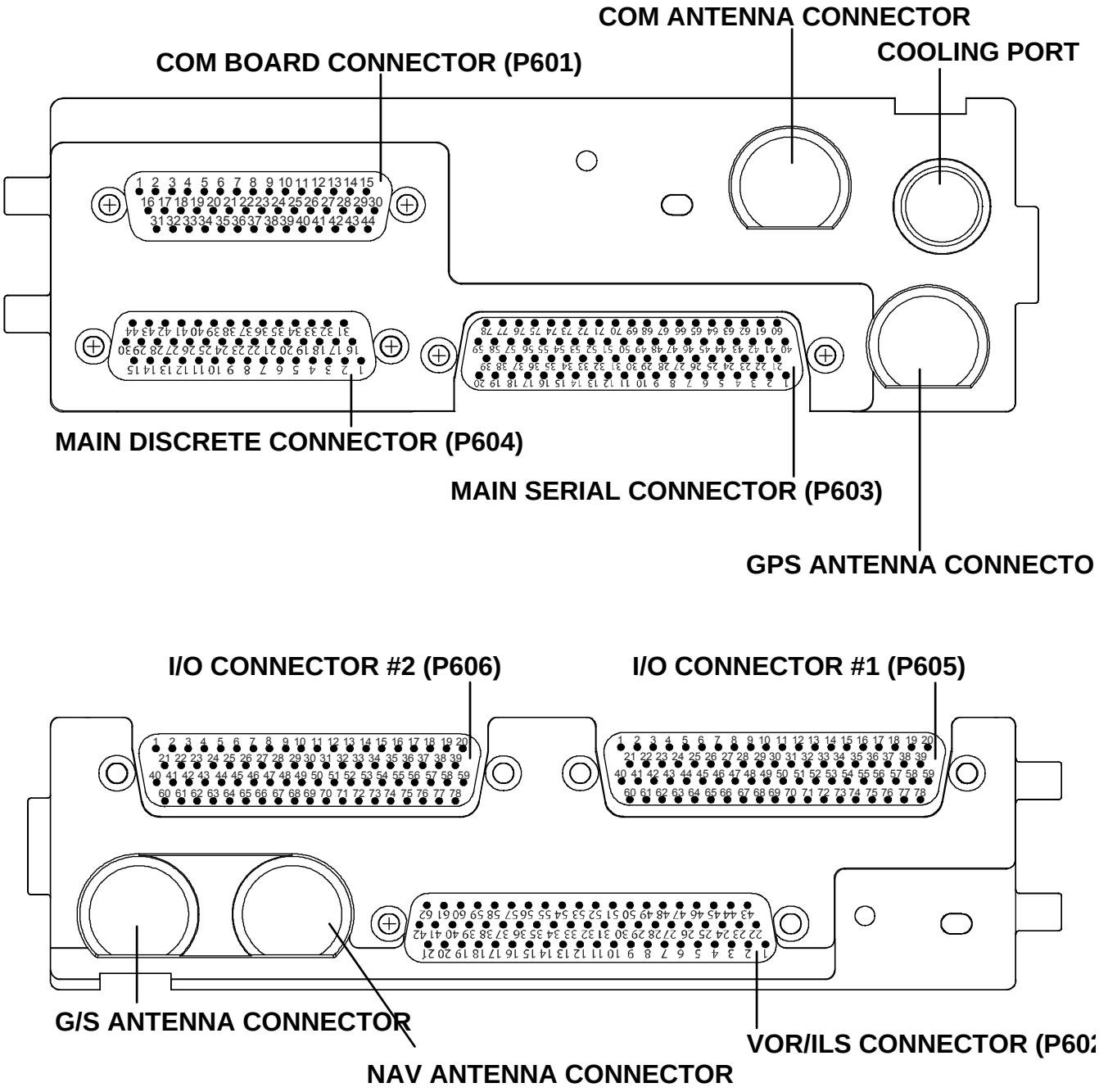


Figure 5-9. GIA 63W Backshell Connectors

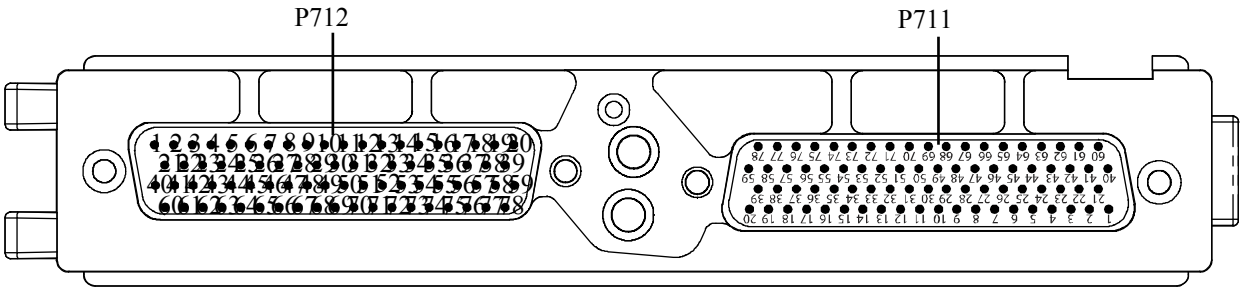


Figure 5-10. GEA 71 Backshell Connectors

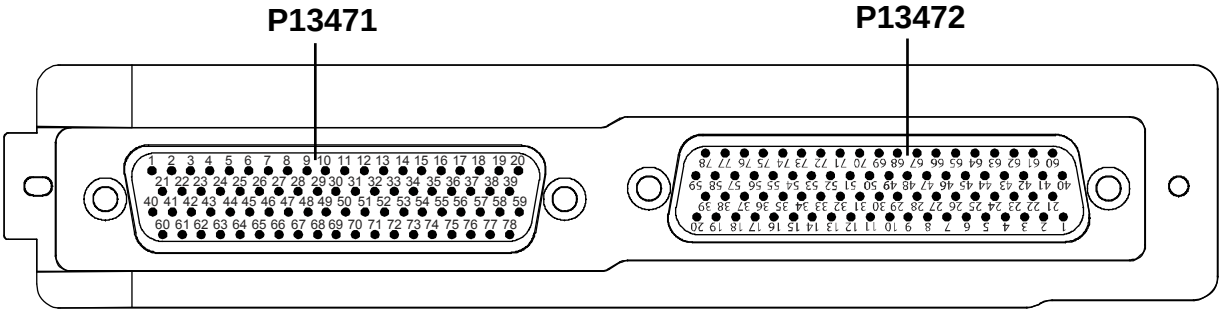


Figure 5-11. GMA 1347D Backshell Connectors

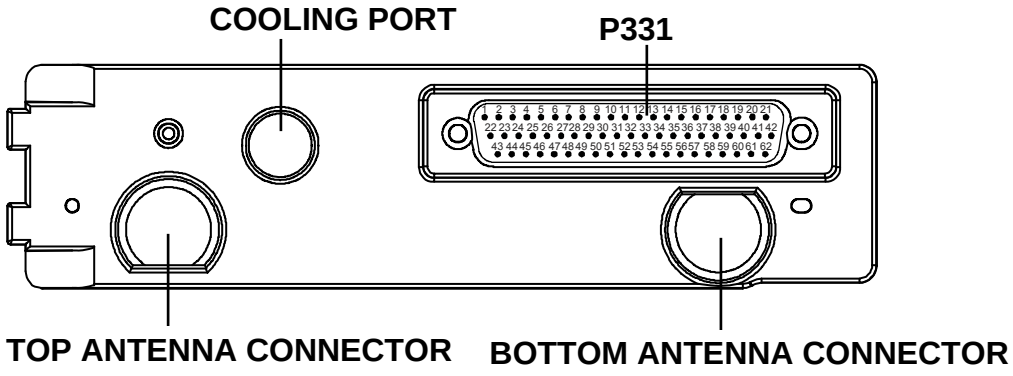


Figure 5-12. GTX 33/33D Backshell Connectors

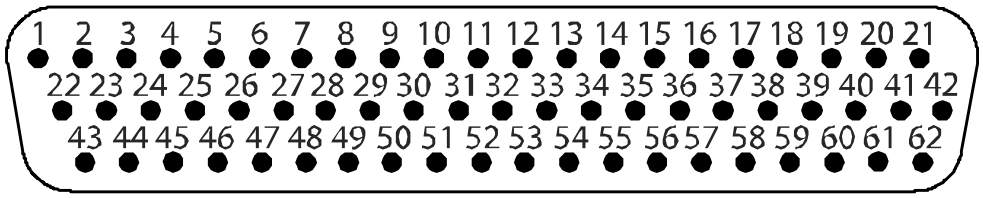


Figure 5-13. GDU 1040A/1500 Backshell Connector (P10401 or P15001)

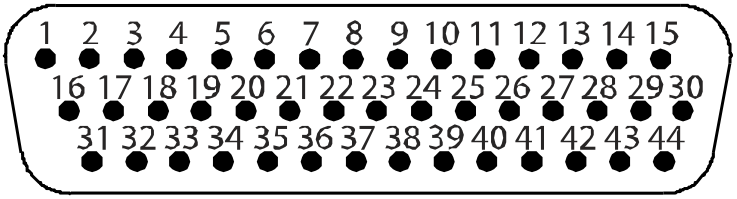


Figure 5-14. GRS 77 Backshell Connector (P771)

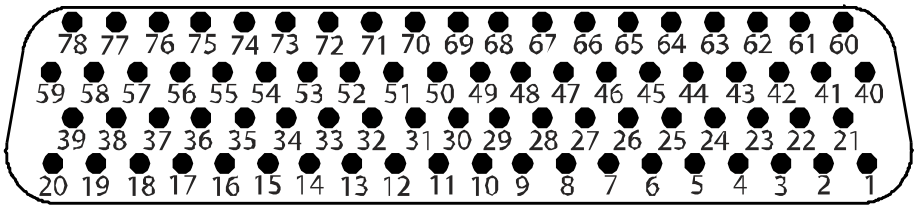


Figure 5-15. GDC 74B Backshell Connector (P74B1)

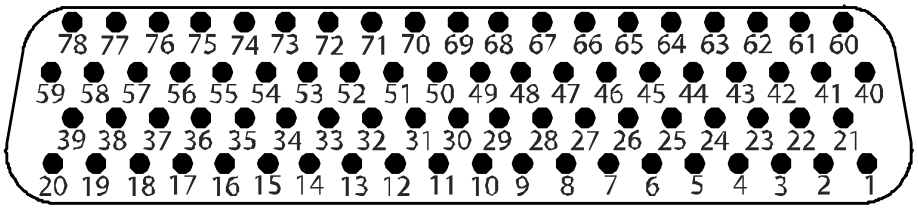


Figure 5-16. GDL 69A Backshell Connector (P69A1)

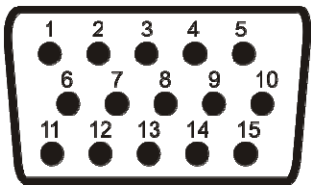


Figure 5-17. GCU 475 Backshell Connector (P4751)

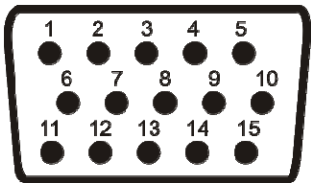


Figure 5-18. GMC 710 Backshell Connector (P7101)

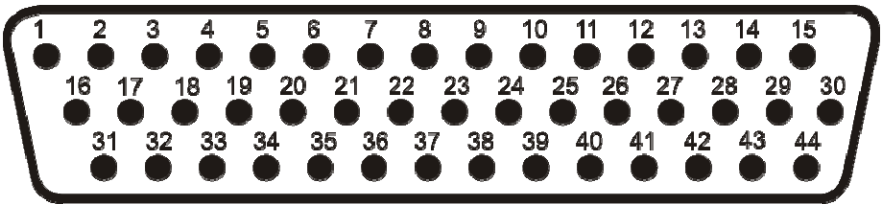


Figure 5-19. GWX 68 Backshell Connector (P681)

5.21 Standby Attitude Indicator Troubleshooting

5.21.1 Standby Attitude Indicator Common Problems

Symptom	Recommended Action
Warning flag pops into view, indicating that the gyro motor is not receiving sufficient power to operate	• Perform the Standby Instrument Electrical Power Checks in Section 8.1.5. • Remove the unit per Section 6.25 and inspect the electrical connector. • Check to ensure appropriate electrical power is being supplied to the instrument. √ If input electrical power is not adequate, troubleshoot the wiring harness. √ If input power is appropriate, the unit must be removed and serviced by a qualified service facility See Section 6.25 for removal instructions. Contact the manufacturer to find a qualified service facility
Unit fails to perform to specifications	• The unit must be removed and serviced by a qualified service facility. See Section 6.25 for removal instructions. Contact the manufacturer to find a qualified service facility.

5.22 Standby Airspeed Indicator Troubleshooting

5.22.1 Standby Airspeed Indicator Common Problems

Symptom	Recommended Action
Airspeed Indicator lighting is inoperative or malfunctioning	• Perform the Standby Instrument Electrical Power Checks in Section 8.1.5. • Remove standby airspeed indicator per Section 6.23 and inspect the electrical connector. • Check that electrical power is being appropriately supplied to the instrument. √ If the input electrical power is not adequate, troubleshoot the wiring harness. √ If the input electrical power is appropriate, replace the standby airspeed indicator or contact the manufacturer for further troubleshooting.
Airspeed displayed is incorrect	• Using a pitot-static ramp tester, check airspeed displayed on standby altimeter against airspeed display from ADC2. √ If the airspeeds are the same, inspect the pitot/static ports and associated equipment for faults. √ If the airspeeds are different, replace the standby altimeter or contact the manufacturer for further troubleshooting. See Section 6.23 for removal instructions.

5.23 Standby Altimeter Troubleshooting

5.23.1 Standby Altimeter Common Problems

Symptom	Recommended Action
Altimeter lighting is inoperative or malfunctioning	• Perform the Standby Instrument Electrical Power Checks in Section 8.1.5. • Remove standby altimeter per Section 6.24 and inspect the electrical connector. • Check that electrical power is being appropriately supplied to the instrument. √ If the input electrical power is not adequate, troubleshoot the wiring harness. √ If the input electrical power is appropriate, replace the standby altimeter or contact the manufacturer for further troubleshooting.
Altimeter Vibrator is inoperative or malfunctioning	
Altitude displayed is incorrect	• Using a pitot-static ramp tester, check altitude displayed on standby altimeter against altitude display from ADC2. √ If the altitudes are the same, inspect the pitot/static ports and associated equipment for faults. √ If the altitudes are different, replace the standby altimeter or contact the manufacturer for further troubleshooting. See Section 6.24 for removal instructions.

5.24 Standby Battery Troubleshooting

Refer to King Air Series Component Maintenance Manual, listed in Table 1-2, for troubleshooting.

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6 Equipment Removal & Replacement

This section describes how to remove and replace equipment in the King Air C90A/C90GT associated with this STC. After removal and replacement, LRUs must be configured and tested as described in Section 7.

CAUTION:

When removing and/or replacing any G1000 component, always ensure that aircraft power is off. Unplug any auxiliary power supplies. Before performing maintenance, **it is required** that the technician verify the LRU software part number and version number matches the software configuration listed in the General Arrangement drawing, listed in Table 1-2.

To check an LRU software part number and/or version:

1. Start the G1000 system in configuration mode as described in Section 3.7.

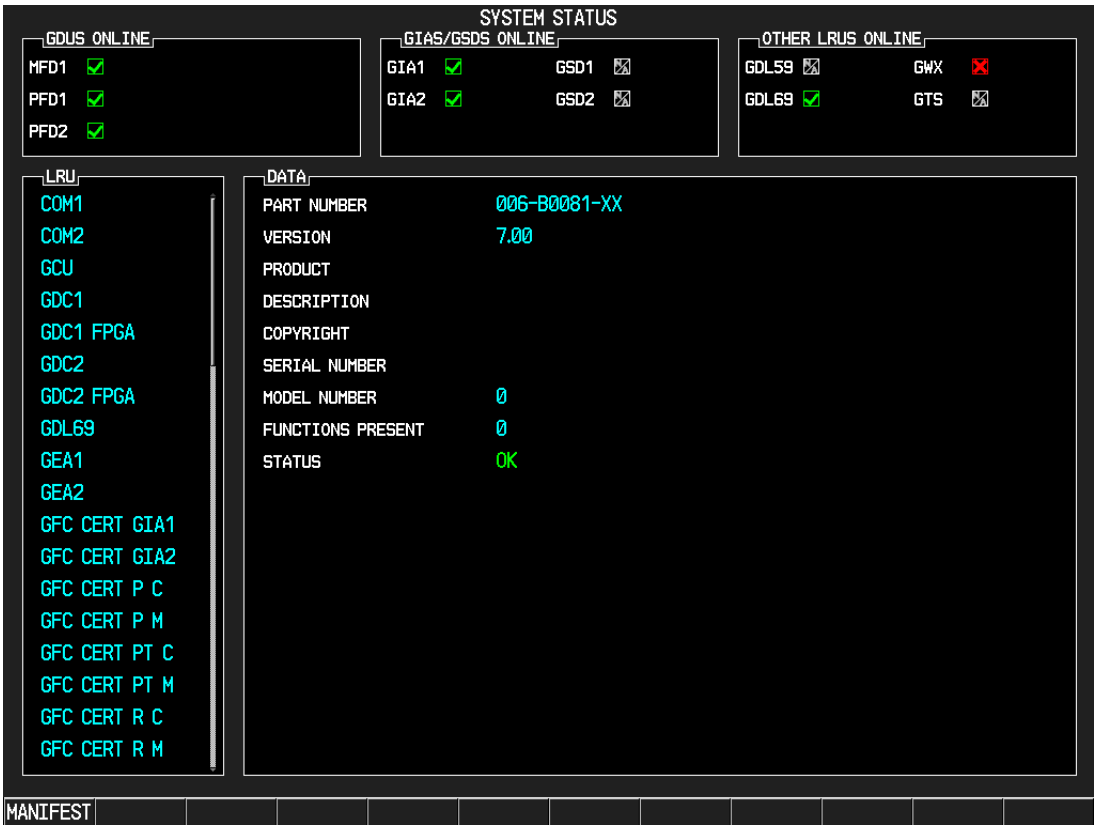

Figure 6-1. System Status Page (Configuration Mode)

2. The System Status page shows a list of LRUs in the LRU window. Activate the cursor and use the FMS knob to scroll through the list in the window and select from the following items:

Control & Display

SYSTEM SW VER OK		**SYSTEM SW VER OK**		**SYSTEM SW VER OK**	
PFD 1	_____	PFD 2 FPGA	_____	GCU	_____
PFD 1 FPGA	_____	MFD1	_____	GMC	_____
PFD 2	_____	MFD1 FPGA	_____		

CNS:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GIA1	_____	GPS2	_____	GDL69	_____
GIA2	_____	GTX1	_____	GWX	_____
GMA1	_____	GTX2	_____	GWX FPGA	_____
GMA2	_____	GIA1 AUDIO	_____		
GPS1	_____	GIA2 AUDIO	_____		

Sensors:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GDC1	_____	GMU2	_____	GEA1	_____
GDC1 FPGA	_____	GMU2 FPGA	_____	GEA2	_____
GDC2	_____	GRS1	_____		
GDC2 FPGA	_____	GRS1 FPGA	_____		
GMU1	_____	GRS2	_____		
GMU1 FPGA	_____	GRS2 FPGA	_____		

AFCS SYSTEM:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GSA PTCH CTL	_____	GSA PTCH TRM M	_____	GSA YAW CTL	_____
GSA PTCH MON	_____	GSA ROLL CTL	_____	GSA YAW MON	_____
GSA PTCH TRM C	_____	GSA ROLL MON	_____		

AFCS CERT GAINS:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GFC CERT GIA1	_____	GFC CERT PT C	_____	GFC CERT YC	_____
GFC CERT GIA2	_____	GFC CERT PT M	_____	GFC CERT YM	_____
GFC CERT PC	_____	GFC CERT RC	_____		
GFC CERT PM	_____	GFC CERT RM	_____		

3. The software part number and version is displayed in the DATA window. Compare this to the software configuration in the General Arrangement drawing, listed in Table 1-2.

NOTE

If a faulty LRU is not reporting its software version and part number, check aircraft maintenance logs for last software version loaded and verify against the General Arrangement drawing. The Software Manifest page may also be used to check part numbers and versions.

6.1 GDU 1040A/1500

Removal:

1. Using a 3/32" hex tool, rotate all four ¼-turn fasteners counter-clockwise until they reach their stops.
2. Carefully remove the display from the panel.
3. While supporting the display, disconnect the connector.

Replacement:

1. Visually inspect the connector and pins for signs of damage. Repair any damage. While supporting the display, connect the connector to the rear of the unit.
2. Carefully insert the display into the panel cutout, ensuring that all 4 ¼-turn fasteners align with the corresponding holes.
3. Seat the display in the panel cutout. Do not use excessive force while inserting the display.
4. Once seated, rotate all four ¼-turn fasteners clockwise to lock the display to the panel.
5. Configure and test the MFD and/or PFD according to Section 7.1.

6.2 GMA 1347D Audio Panel

Removal:

1. Using a 3/32" hex tool, turn the hex nut counter-clockwise until the GMA 1347D is unlocked from its location.
2. Carefully remove the GMA 1347D from its rack.

Replacement:

1. Visually inspect the connectors to ensure there are no bent or damaged pins. Repair any damage.
2. Gently insert the GMA 1347D into the rack until the locking tab engages the rack.
3. Begin to turn the hex nut clockwise. This draws the unit into the rack until seated. Do not over-tighten the nut.
4. Configure and test the GMA 1347D according to Section 7.2.

6.3 GIA 63W Integrated Avionics Units

Removal:

1. Unlock the GIA 63W handle by loosening the Phillips screw on the handle.
2. Pull the handle upward to unlock the GIA 63W. Gently remove the unit from the rack.

Replacement:

1. Visually inspect the connectors to ensure there are no bent or damaged pins. Repair any damage.
2. Gently insert the GIA 63W into its rack. The handle should engage the dogleg track.
3. Press down on the GIA 63W handle to lock the unit into the rack.
4. Lock the handle to the GIA 63W body using the Philips screw.
5. Configure and test the GIA 63W(s) according to Section 7.3.

6.4 GEA 71 Engine/Airframe Unit

Removal:

1. Unlock the GEA 71 handle by unscrewing the Phillips screw.
2. Firmly grasp the GEA 71 handle and pull it up vertically. This unlocks the unit from the rack.
3. Gently remove the GEA 71 from its rack.

Replacement:

1. Visually inspect the connectors to ensure there are no bent or damaged pins. Repair any damage.
2. Gently insert the GEA 71 into the rack. The handle should engage the dogleg track.
3. Press down on the handle to lock the unit into place.
4. Lock the handle to the GEA 71 body using the Philips screw.
5. Configure and test the GEA 71 according to Section 7.4.

6.5 GTX 33 Transponder

Removal:

1. Unlock the GTX 33 handle by loosening the Phillips screw on the handle.
2. Pull the handle upward to unlock the GTX 33. Gently remove the unit from the rack.

Replacement:

1. Visually inspect the connectors to ensure there are no bent or damaged pins. Repair any damage.
2. Gently insert the GTX 33 into its rack. The handle should engage the dogleg track.
3. Press down on the GTX 33 handle to lock the unit into the rack.
4. Lock the handle to the GTX 33 body using the Philips screw.
5. Configure and test the GTX 33 according to Section 7.5.

6.6 GDC 74B Air Data Computer

Removal:

1. Disconnect the pitot/static plumbing from the rear of the unit. Disconnect the single connector.
2. Loosen each thumbscrew on the hold-down clamp and remove the clamp.
3. Carefully remove the unit from its mount.

Replacement:

1. Inspect the connector and pins for damage. Inspect the pitot/static plumbing for damage. Repair any damage.
2. Place the unit in the mounting tray. Position the locking clamp and fasten using the thumbscrews.
3. Connect the backshell assembly and pitot/static plumbing to the unit.
4. Configure and test the GDC 74B according to Section 7.6.

6.7 GTP 59 OAT Probe

Removal:

1. Using a deep-socket to hold the probe in place on the outside of the aircraft, loosen the GTP 59 mounting nut and remove the GTP 59.

Replacement:

1. Replacement is the reverse of removal.
2. No configuration is required for the GTP 59. Test according to Section 7.6.4.

6.8 GRS 77 AHRS

Removal:

1. Disconnect the AHRS connector.
2. Remove the four Phillips thumbscrews with a screwdriver and set them aside.
3. Gently lift the GRS 77 from the mounting rack. (If the mounting rack is removed, the GRS 77 must be re-calibrated. Do not loosen mounting bolts. See Section 7.7)

Replacement:

1. Visually inspect the connectors to ensure there are no bent or damaged pins. Repair any damage.
2. Place the GRS 77 on the mounting plate, ensuring the orientation is correct.
3. Fasten the unit to the plate using the Phillips thumbscrews.
4. Connect the connector to the GRS 77.
5. Calibrate, and test the GRS 77 according to Section 7.7.

6.9 GMU 44 Magnetometer

Removal:

1. Loosen three screws connecting the unit to the aircraft mounting bracket using a non-magnetic Phillips screwdriver.
2. Disconnect the wiring harness.

Replacement:

1. Visually inspect the connectors to ensure there are no bent or damaged pins. Repair any damage. Connect the wiring harness to the GMU 44.
2. Fasten the GMU to the aircraft mounting bracket using a non-magnetic Phillips screwdriver.
3. Calibrate and test the GMU 44 according to Section 7.7.

6.10 GDL 69A

Removal:

1. Unlock the GDL 69A handle by loosening the Phillips screw on the handle.
2. Pull the handle upward to unlock the GDL 69A. Gently remove the unit from the rack.

Replacement:

1. Visually inspect the connectors to ensure there are no bent or damaged pins. Repair any damage.
2. Gently insert the GDL 69A into its rack. The handle should engage the dogleg track.
3. Press down on the GDL 69A handle to lock the unit into the rack.
4. Lock the handle to the GDL 69A body using the Philips screw.
5. Configure and test the GDL 69A according to Section 7.8.

6.11 GSA 80/81 Servos

Removal:

1. Gain access to the desired servo(s).
2. Disconnect the servo harness connector.
3. Use a socket or open-wrench to loosen and remove the servo attachment bolts. The Pitch-Trim servo bracket will need to be removed to access all the Pitch-Trim servo attachment bolts.
4. Carefully remove the servo and place a protective cover on the output gear.
5. Place a protective cover over the GSM 85A servo mount.

Replacement:

1. Inspect the output gear for abnormal wear or the absence of grease. If grease is required, refer to Section 4.7 and grease the gear.
2. Carefully place the servo into the servo mount, ensuring proper orientation and alignment.
3. Fasten the servo to the servo mount using the existing hardware.
4. Inspect the harness connectors and check that no pins are bent or otherwise damaged. Connect the harness and secure it appropriately.
5. If no further maintenance is required, continue to Section 7.9.

6.12 GSM 85A Servo Mounts

Removal:

1. Remove the desired servo(s) per Section 6.11.
2. For the Roll, Pitch and Yaw Servos: remove the servo cable from the control cable clamps. For the Pitch-Trim Servo: remove the servo cable from the outboard turnbuckle and Y-splice.
3. Use a socket or open-wrench to loosen and remove the servo attachment bolts.
4. Carefully remove the servo mount(s).
5. Remove the cable retention pins and ring (or cover) and then remove the servo cable from the capstan.

Replacement:

1. Ensure cable retention pins are oriented correctly. Follow the installation instructions provided in the respective servo installation drawing(s), listed in Table 1-2.
2. If no other maintenance is to be performed, reinstall the servo(s) per Section 6.11.

6.13 GCU 475

Removal:

1. Use a 3/32” hex drive tool to turn each of the four locking sockets ¼ turn counterclockwise until they reach their stops.
2. Disconnect backshell assembly from unit.

Replacement:

1. Inspect connector(s) for damaged pins.
2. Connect backshell assembly to unit.
3. Hold unit flush with the instrument panel, ensuring locking stud alignment marks are in the vertical position.
4. Use a 3/32” hex drive tool to turn each of the four locking sockets ¼ turn clockwise. This may require applying a small amount of forward pressure to engage the ¼ turn sockets.
5. Configure and test the GCU 475 according to Section 7.10.

6.14 GMC 710

Removal:

1. Use a 3/32” hex drive tool to turn each of the four locking sockets ¼ turn counterclockwise until they reach their stops.
2. Disconnect backshell assembly from unit.

Replacement:

1. Inspect connector(s) for damaged pins.
2. Connect backshell assembly to unit.
3. Hold unit flush with the instrument panel, ensuring locking stud alignment marks are in the vertical position.
4. Use a 3/32” hex drive tool to turn each of the four locking sockets ¼ turn clockwise. This may require applying a small amount of forward pressure to engage the ¼ turn sockets.
5. Configure and test the GMC 710 according to Section 7.11.

6.15 GWX 68

Removal:

1. Disconnect backshell assembly from unit.
2. Use a 3/16” hex drive tool to remove each of the four mounting screws.

Replacement:

1. Inspect connector for damaged pins.
2. Hold unit flush with the radar mount.
3. Use a 3/16” hex drive tool to tighten each of the four mounting screws.
4. Connect backshell assembly to unit.
5. Configure and test the GWX 68 according to Section 7.12.

6.16 Configuration Module Removal & Replacement

Configuration modules (Item 1 shown below) are located in the following LRU harness connector backshells (Item 6): GDU 1040A PFD, GRS 77 AHRS, GDC 74B Air Data Computer, and the GEA 71 Engine/Airframe Unit. Refer to the Master Drawing List, listed in Table 1-2, for specific installation drawings.

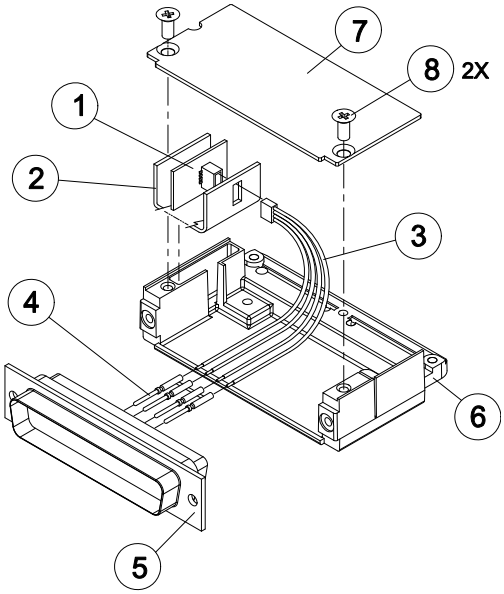

Figure 6-2. Configuration Module Installation

Table 6-1. Configuration Module Kit – 011-00979-00

Item	Description	Qty Needed	Garmin Part Number
1	Configuration Module PCB Board Assembly w/EEPROM & Temp Sensor	1	012-00605-00
2	Spacer, Config Module	1	213-00043-00
3	Cable, 4-Conductor Harness	1	325-00122-00
4	Pins, #22 AWG (HD)	5	336-00021-00

Removal:

1. Disconnect connector from LRU.
2. Remove 2 screws (8) from cover (7) and remove cover.
3. Unplug connector from configuration module (1).
4. Remove configuration module.

Replacement:

1. Inspect connector for damaged pins (4).
2. Place configuration module (1) in position.
3. Insert connector into configuration module (1).
4. Assembly of the connector is the reverse of disassembly.
5. Continue to Section 6.16.1.

6.16.1 Configuration Module Checkout

If a GRS 77 AHRS Configuration Module is replaced:

All three GRS 77/GMU 44 calibration procedures must be performed. Proceed to Section 7.7.3.

If a GDC 74B Configuration Module is replaced:

Configuration settings must be reloaded to the GDC 74B. Proceed to Section 7.6.2.

If a GEA 71 Configuration Module is replaced:

Proceed to Section 7.4.1.

If only the Master Configuration Module is replaced:

NOTE

New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.

1. Start the G1000 system in configuration mode.
2. Go to the Configuration Upload Page on PFD 1.
3. Press the UPDT CFG softkey and press ENT.

If both PFD 1 and Master Configuration Module are replaced:

NOTE

New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 System ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.

1. The entire G1000 system must be re-configured. Insert the correct G1000 software loader card into PFD 1.
2. Start the G1000 in configuration mode. Go to the System Upload Page on PFD 1.
3. See Section 3.9 for instructions on how to use the System Upload page. Check all configuration files and reload them.
4. After reloading configuration files, examine the G1000 installation for any installed configuration options. Options are listed in Section 3.9.4.3. Load optional files as necessary.
5. Continue to Section 8 and conduct the return to service checkout.

6.17 GEA 71 Backshell Thermocouple Removal & Replacement

The GEA 71 has a K-Type thermocouple (Item 1 shown below) installed in its backshell, in addition to the configuration module. The thermocouple is used in conjunction with the configuration module temperature sensor to compensate for temperature probe errors resulting from the dissimilar metals at the pin contacts.

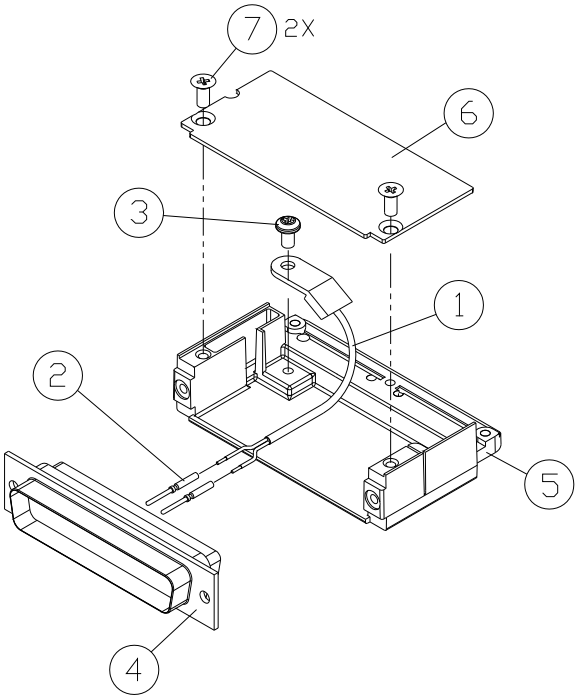

Figure 6-3. GEA Backshell Thermocouple

Table 6-2. Thermocouple Kit (011-00981-00)

Item #	Description	Qty. Needed	Garmin Part Number
1	3” Thermocouple, K type	1	925-L0000-00
2	Pins #22 AWG	2	336-00021-00
3	Screw	1	211-60234-08

Removal:

1. Remove GEA 71 per Section 6.4.
2. Remove GEA connector backplate.
3. Remove connector J711, item 5, from the backplate.
4. Remove cover, item 6 from the backshell.
5. Unscrew thermocouple from boss on backshell. Extract the thermocouple pins from the connector.

Replacement:

1. Crimp pins, item 2, onto each of the thermocouple wires, item 1. Ensure that pre-stripped wire length is 1/8" prior to crimping.
2. Insert newly crimped pins and wires into the appropriate connector housing location, item 4, as specified by King Air C90 Wiring Diagram, listed in Table 1-2.
3. Place thermocouple body, item 1, onto the backshell boss, item 5. Place the thermocouple as shown in Figure 6-3 so that the wires exit towards the bottom of the backshell.
4. Fasten thermocouple tightly to backshell using the provided screw, item 3.
5. Fasten cover, item 6, to backshell using the provided screws, item 7.
6. Continue to Section 7.4.1 and verify that the ITT indications are valid on the MFD.

6.18 Comant CI428-410 / CI428-200 GPS/WAAS Antennas

Remove and install the GPS/WAAS antennas in accordance with the antenna installation drawing (refer to Master Drawing List, listed in Table 1-2, for specific drawing number). For procedural instructions on accessing the GPS antennas, refer to the King Air Model 90 Series Maintenance Manual, listed in Table 1-2.

Proceed to Section 7.3.1 GPS Signal Acquisition for testing.

6.19 Engine Signal Conditioners

Removal:

1. For the Signal Conditioner No. 1, remove PFD1 from the instrument panel as per Section 6.1. For the Signal Conditioner No. 2, remove PFD2 from the instrument panel as per Section 6.1.
2. Remove three top screws from signal conditioner rack.
3. Slide mounting tray out from rack and disconnect the unit connector. If needed, remove MFD as per Section 6.1 to access the signal conditoner connector.
4. Remove the four mounting bolts and remove the signal conditioner unit.
5. If planning to reinstall the same unit, it is not necessary to disconnect the ground strap from the unit ground stud. If replacing with a new unit, disconnect the ground strap from the removed unit and retain the ground strap and associated hardware for reinstallation on the new unit.

NOTE

The signal conditioner ground strap was added by STC SA01456WI-D Master Drawing List, 005-00375-30, Revision 5 and subsequent approved revisions for aircraft with Vibro-Meter Signal Conditioner PN 85-292-2. The ground strap is not applicable to installations with the Sandia ST26 tach-gen adapter unit.

Reinstallation:

1. Reinstallation of the signal conditioner unit is the reverse of the removal. Reference the Main Instrument Panel Installation drawing, listed in Table 1-2, for more details.
2. Proceed to Section 7.4.1 for testing.

6.20 Senior Aerospace PC920 Signal Conditioning Unit

NOTE

The PC920 is applicable to installations with STC SA01456WI-D Master Drawing List, 005-00375-30, Revision 4 and previous approved revisions for aircraft with Senior Aerospace Ketema fuel flow transducer, part number 1/2-2-81-306.

Removal:

1. Remove PFD1 from the instrument panel as per Section 6.1.
2. Remove 3 top screws from PC920 rack.
3. Slide mounting tray out from rack and disconnect the unit connector. If needed, remove MFD as per Section 6.1 to access the PC920 connector.
4. Remove the four mounting bolts and remove the PC920 unit.

Reinstallation:

1. Reinstallation of the PC920 unit is the reverse of the removal. Reference the Main Instrument Panel Installation drawing, listed in Table 1-2, for more details.
2. Perform PC920 portion of the Bonding Check in Section 4.5 for each PC920 unit installed by this procedure.
3. Proceed to Section 7.4.1 for testing.

6.21 Instrument Panel Annunciators (Prop Synch and Standby Battery)

Removal:

1. Remove MFD from the instrument panel as per Section 6.1.
2. Using a M22885/108T8234 extraction tool, disconnect connector from the back of the switch.
3. Pull the pushbutton cap fully out of the switch body and allow the cap to rotate 90° where it is held by the retaining element.
4. While holding the retaining sleeve (back side of the instrument panel), loosen the two screws inside the switch body until the switch is free to come out.
5. Remove the mounting sleeve and switch from the instrument panel.

Reinstallation:

1. Reinstallation of the Prop Synch and Standby Battery switches is the reverse of the removal. Reference the Main Instrument Panel Installation drawing, listed in Table 1-2, for more details.
2. Press and hold the cockpit annunciator "Press To Test" switch located to the left of the annunciator panel, and verify the following:
    a. For the Standby Battery Annunciator/Switch: STBY Battery Switch legends illuminates and reflects "STANDBY BATTERY" in white, "ARM" in green, and "ON" in amber.
    b. For the Prop Synch Annunciator/Switch: Prop Synch Switch legends illuminates and reflects "PROP SYNC" in white, and "ON" in green.
6. Release cockpit annunciator "Press To Test" switch.
7. If further maintenance is not required, proceed to Section 8.

6.22 L-3 Avionics (BF Goodrich) PS-835(C or D Model) Emergency Battery

NOTE

The emergency battery was added by this STC (in the nose equipment compartment) for aircraft that did not have a pre-existing factory installation (typically located in the tail). For aircraft with the factory installation, refer to the King Air Model 90 Series Maintenance Manual, listed in Table 1-2, for removal and replacement information.

Removal:

1. Unscrew the knurled hold-down nut to allow it to move free of the unit.
2. Remove the unit from the rack.

Reinstallation:

1. Install the emergency battery in accordance with the standby battery installation drawing (refer to Master Drawing List, listed in Table 1-2, for specific drawing number). Refer to the King Air Model 90 Series Maintenance Manual, listed in Table 1-2, for access requirements as needed. For aircraft which the standby battery was installed by this STC, the maintenance will be as per the King Air manual but the access will be through the nose avionics compartment.
2. If further maintenance is not required, proceed to Section 8.

6.23 Thommen Standby Airspeed Indicator

Removal:

1. Remove MFD per Section 6.1.
2. Disconnect pitot-static plumbing from the back of the standby airspeed indicator.
3. Disconnect the electrical connector from the standby airspeed indicator.
4. Use a Phillips screwdriver to remove the three attachment screws from the front of the standby airspeed indicator.
5. Remove the standby airspeed indicator.

Replacement:

1. Reinstallation of the standby airspeed indicator is the reverse of the removal. Reference the Main Instrument Panel Installation drawing, listed in Table 1-2, for more details.
2. If further maintenance is not required, proceed to Section 8.

6.24 Thommen Standby Altimeter

Removal:

1. Remove MFD per Section 6.1.
2. Disconnect pitot-static plumbing from the back of the standby altimeter.
3. Disconnect the electrical connector from the standby altimeter.
4. Use a Phillips screwdriver to remove the three attachment screws from the front of the standby altimeter.
5. Remove the standby altimeter.

Replacement:

1. Reinstallation of the standby altimeter is the reverse of the removal. Reference the Main Instrument Panel Installation drawing, listed in Table 1-2, for more details.
2. If further maintenance is not required, proceed to Section 8.

6.25 Mid-Continent Standby Attitude Indicator

Ensure the standby attitude indicator gyro is not spinning—this may take 10 minutes or longer after the unit has been turned off. This unit is very delicate; handle like eggs. Refer to the 4200 Series Attitude Indicator Installation Manual, listed in Table 1-2, for more handling instructions.

Removal:

1. Remove MFD per Section 6.1.
2. Disconnect the electrical connector of the standby attitude indicator.
3. Use a 0.060" 6-Spline wrench to remove the knob from the front of the standby attitude indicator.
4. Use a Phillips screwdriver to remove the three attachment screws from the front of the standby attitude indicator.
5. Remove the standby attitude indicator.

Replacement:

1. Reinstallation of the standby attitude indicator is the reverse of the removal. Reference the Main Instrument Panel Installation drawing, listed in Table 1-2, for more details.
2. If further maintenance is not required, proceed to Section 8.

6.26 Sandia Avionics Cooling Fans

Removal:

1. Gain access into the nose avionics equipment bay.
2. Disconnect the cooling fan hoses from the cooling fan.
3. Disconnect the electrical connector of the cooling fan.
4. Use a Phillips screwdriver to remove the three attachment screws from the cooling fan.
5. Remove the cooling fan.

Replacement:

1. Reinstallation of the Sandia avionics cooling fan is the reverse of the removal. Reference the Electrical Equipment Install, Nose Bay drawing, listed in Table 1-2, for more details.
2. If further maintenance is not required, proceed to Section 8.

6.27 Sandia GDU Cooling Fans

Removal:

1. Remove the display associated with the cooling fan, per Section 6.1.
2. Disconnect the electrical connector of the cooling fan.
3. Use a Phillips screwdriver to remove the four attachment screws from the cooling fan.
4. Remove the cooling fan.

Replacement:

1. Reinstallation of the Sandia GDU cooling fan is the reverse of the removal. Reference the Main Instrument Panel Installation drawing, listed in Table 1-2, for more details.
2. If further maintenance is not required, proceed to Section 8.

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7 G1000 Equipment Configuration & Testing

This section provides procedures to be followed after a piece of G1000 equipment is replaced. At the beginning of each LRU section, instructions are given to guide the technician for various removal/replacement scenarios. These instructions define necessary procedures to be followed for situations where original equipment was reinstalled as well as for situations where new equipment (new serial number) is installed.

CAUTION

Remove Supplemental Database Cards from the lower slot of all displays before loading software into any unit. Not removing the cards may corrupt them. Replacing corrupted database cards are not covered under warranty.

NOTE

Garmin recommends the use of SanDisk or Cactus brand SD cards to load G1000 software and configuration files. If another brand of card is used, and software loading problems occur, replace the card with a SanDisk or Cactus brand card and reattempt the software load.

WARNING

Connect a ground power unit to the aircraft for software loading. Do not rely on only the aircraft batteries to prevent loss of power during the software loading process. DO NOT ALLOW POWER TO BE REMOVED FROM THE SYSTEM WHEN LOADING SOFTWARE! Remove power only when told to do so by the following procedure. As a general rule all displays should be in the same mode (configuration or normal), unless instructed differently.

7.1 GDU 1040/1500 MFD & PFD

Original Display Reinstalled

If the removed display(s) are re-installed in their original positions, no software or configuration loading is required. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the PFD/MFD Test procedure.

Original PFD Displays Installed in Opposite Locations for Troubleshooting

If the PFD 1 and PFD 2 are installed in opposite positions, no software or configuration loading is required. Continue to the PFD/MFD Test procedure.

New Repair or Exchange Display(s) Installed

If a new, repaired or exchange GDU 1040A or GDU 1500 is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9. If ChartView or TAWS were previously installed, these must be reactivated. See Sections 3.9.7 and 3.9.8 respectively. If any other options were previously installed, these must also be reactivated per Section 3.9.4. Then continue to the PFD/MFD Test procedure.

7.1.1 PFD/MFD Test

1. Allow displays to initialize for ~1 minute.
2. Check that all COM/NAV display fields are valid in the top corners of both PFDs.

3. Check that attitude, heading, altitude, airspeed, vertical speed and OAT fields are valid within 2 minutes of power up on both PFDs.
4. Press the SENSOR softkey on each PFD and switch between ADC1 and ADC2. Verify that data from both GDC 74Bs is valid on both displays.
5. Press the SENSOR softkey on each PFD and switch between AHRS1 and AHRS2. Verify that data from both GRS 77s is valid on both displays.
6. Check that the engine instrument fields are valid on the MFD.

Figure 7-1. G1000 Normal Mode Check

7. Push the red DISPLAY BACKUP button on the pilot-side GMA 1347D. Verify that the pilot-side PFD and MFD displays enter reversion mode. MFD should have valid altitude, airspeed, vertical speed, COMM1, COMM2, NAV1, NAV2 and engine instruments.
8. De-activate pilot-side reversion mode by pushing the DISPLAY BACKUP button. Verify PFD 1 and MFD return to normal display modes.
9. Repeat Step 1 using GMA2. Ensure that PFD 2 and MFD enter reversion mode and MFD displays valid altitude, airspeed, vertical speed, COMM1, COMM2, NAV1, NAV2 and engine instruments.
10. De-activate co-pilot's side reversion mode by pushing the DISPLAY BACKUP button. Verify PFD 2 and MFD return to normal display modes.
11. If TAWS was activated, select the TAWS page (4th page in the MAP group) on the MFD.
    a. Verify that the title at the top of the page reads "MAP – TAWS-B". If TAWS has not been enabled, the title will read "MAP – TERRAIN PROXIMITY" or "MAP – TERRAIN".
    b. Press the MENU button and select "Test TAWS" from the pop-up menu.
    c. After the TAWS test has completed, verify that "TAWS System Test Okay" is heard over the cockpit speaker.
12. If no other service is to be performed, perform final return-to-service test as specified in Section 8.

7.2 GMA 1347D Audio Panel

Original GMA 1347D Reinstalled

No software/configuration loading or testing is required if the removed GMA 1347D is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the final return-to-service checks in Section 8.

Original GMA 1347D Installed in Opposite Locations for Troubleshooting

If the original GMA #1 and GMA #2 are installed in opposite locations, configuration loading is required. See Section 3.9, and then continue to the GMA 1347D Test (Section 7.2.1).

New Repaired or Exchange GMA 1347D Installed

If a new repaired or exchanged GMA 1347D is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9, and then continue to the GMA 1347D Test (Section 7.2.1).

7.2.1 GMA 1347D Test

Except for marker beacon operation, an in-aircraft checkout may be performed in the aircraft with known good microphone, headset, and speaker.

7.2.1.1 Intercom System (ICS) Check for GMA 1347D, PN 011-01257-00.

NOTE

This procedure is applicable only to aircraft equipped with GMA 1347D Part Number 011-01257-00. Reference Figure 3-6 for control button identification and location for the GMA 1347D, PN 011-01257-00.

1. Ensure that the MAN SQ key is off (no light).
2. Adjust GMA1 and GMA2 ICS volume to a comfortable level.
3. Plug in a headset at each COCKPIT ICS position. One at a time, plug a headset into each left and right CABIN ICS jack location (one headset on right, one headset on left).
4. Verify the following:
   - Two-way communication between each CABIN ICS jack position.
   - CABIN ICS position cannot hear the pilot and copilot.
   - CABIN ICS positions cannot be heard by the pilot or copilot.
5. On GMA1 select COM1 MIC and AUDIO.
6. Ensure INTR COM is deselected on GMA1 or GMA2. Verify an active (green) COM1 frequency is displayed on both PFDs.
7. On GMA1 or 2 select PA and verify the PA select annunciator is illuminated on GMA1 and GMA2. Verify COM1 active frequency is displayed white
8. Initiate passenger address using pilot's headset boom mic by keying the pilot's PTT. Verify the following:
   - Clear PA audio can be heard over cabin speaker and CABIN ICS headsets
   - PA selected annunciator on GMA1 flashes ~ once per second during PA address.
9. Repeat Step 8 using pilot hand mic.
10. Initiate passenger address using copilot's headset boom mic by keying the copilot's PTT. Verify the following:

- Clear PA audio can be heard over cabin speaker and CABIN ICS headsets
- PA selected annunciator on GMA1 flashes ~ once per second during PA address.

11. Repeat Step 10 using copilot hand mic.

7.2.1.2 Intercom System (ICS) Check for GMA 1347D, PN 011-01257-20.

NOTE

This procedure is applicable only to aircraft equipped with GMA 1347D Part Number 011-01257-20. Reference Figure 3-7 for control button identification and location for the GMA 1347D, PN 011-01257-20.

1. Ensure that the MAN SQ key is off (no light).
2. Adjust GMA1 and GMA2 ICS volume to a comfortable level.
3. One at a time, plug a headset into each left and right CABIN ICS jack location (one headset on right, one headset on left).
4. Verify the following:
   - Two-way communication between each CABIN ICS jack position.
   - CABIN ICS positions cannot be heard by the pilot or copilot.
5. Select GMA1 INTR COM button and verify the following:
   - Passengers can communicate with each other.
   - GMA2 INTR COM light is illuminated.
   - The pilot and copilot can communicate with each other and cannot hear passengers.
6. Deselect INTR COM.
7. On GMA1 select CABIN button and verify the following:
   - Passengers can communicate with each other.
   - The pilot (copilot if GMA2 CABIN selected) and passengers can all hear each other.
   - On GMA1 deselect CABIN button.
8. Repeat step 7 using GMA2.
9. Select CABIN button on both GMAs and verify the following:
   - Passengers can communicate with each other.
   - The pilot and copilot can communicate with each other and the passengers.
10. Deselect the CABIN button on both GMAs.
11. On both GMAs select COM1 MIC and AUDIO.
12. Ensure INTR COM is deselected on GMA1 or GMA2. Verify an active (green) COM1 frequency is displayed on both PFDs.
13. On GMA1, select PA and verify the PA select annunciator is illuminated on GMA1. Verify COM1 active frequency is displayed white.

14. On GMA 2, select PA and verify the PA select annunciator is illuminated on GMA2. Verify COM1 active frequency is displayed white.
15. Initiate passenger address using pilot's headset boom mic by keying the pilots PTT. Verify clear PA audio can be heard over cabin speaker and passenger headsets, PA selected annunciator on GMA1 flashes ~ once per second during PA address. Repeat using pilot hand mic.
16. Initiate passenger address using copilot's headset boom mic by keying the copilots PTT. Verify clear PA audio can be heard over cabin speaker and passenger headsets, PA selected annunciator on GMA1 flashes ~ once per second during PA address. Repeat using copilot hand mic.

7.2.1.3 Transceiver Operational Check

Perform a ramp test radio check by exercising the installed transceivers, microphone, microphone key and audio over the headphones and speaker. Verify that communications are clear and PTT operation is correct for each pilot position.

1. On the pilot's audio panel, select the audio source corresponding to each installed avionics unit (i.e. NAV1, NAV2, COM1, COM2, ADF and DME) and check for audio over the pilot's headset.
2. Press the SPKR key on the pilot's audio panel and verify that the selected audio is heard over the pilot's speaker.
3. On the co-pilot's audio panel, select the audio source corresponding to each installed avionics unit (i.e. NAV1, NAV2, COM1, COM2, ADF and DME) and check for audio over the co-pilot's headset.
4. Press the SPKR key on the co-pilot's audio panel and verify that the selected audio is heard over the co-pilot's speaker.

7.2.1.4 Failsafe Operation Check – GMA 1347D #1

1. Turn the GMA 1347D #1 off by pulling the AUDIO NO 1 circuit breaker. This directs all COM 1 phone audio, MIC audio and MIC key to the pilot's position.
2. Check the failsafe operation by exercising the COM 1 boom mic, hand mic, microphone key and audio over the headphones. All volume control for the COM audio should be through the PFD volume control. Verify proper operation of COM 1 using the failsafe operation.
3. Close the AUDIO NO 1 circuit breaker to continue testing.

7.2.1.5 Failsafe Operation Check – GMA 1347D #2

1. Turn the GMA 1347D #2 off by pulling the AUDIO NO 2 circuit breaker. This directs all COM 2 phone audio, MIC audio and MIC key to the co-pilot's position.
2. Check the failsafe operation by exercising the COM 2 boom mic, hand mic, microphone key and audio over the headphones. All volume control for the COM audio should be through the PFD volume control. Verify proper operation of COM 2 using the failsafe operation.
3. Close the AUDIO NO 2 circuit breaker to continue testing.

7.2.1.6 Marker Beacon Test

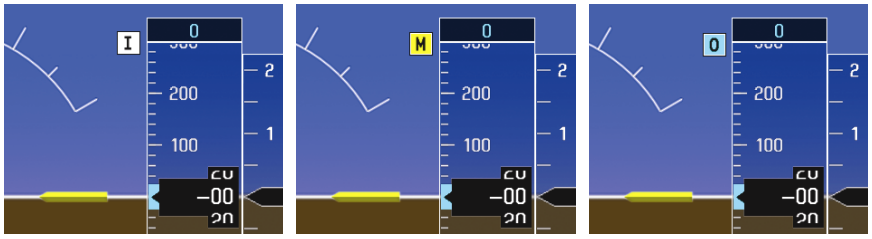


Figure 7-2. Marker Beacon Symbology

1. Using a ramp tester, simulate the outer marker, middle marker and inner marker signals by following the test equipment manufacturer's instructions. Verify that each marker audio signal is present over the pilot and co-pilot headphones and speaker.
2. Verify that the outer, middle, and inner annunciations appear on PFD 1 and PFD 2 when the corresponding signal is applied. Marker beacon annunciations appear at the upper left corner of the altitude indicator on the PFD (Figure 7-2). Operate the MKR MUTE key on the #1 and #2 GMA 1347D and ensure that the audio signal is muted.
3. If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.2.2 Landing Gear Aural Alert Check

This check should be conducted in conjunction with the Phase 2 and Phase 4 Landing Gear Retraction, Warning Horn check, in the existing King Air Maintenance Program.

NOTE

This procedure is applicable only to aircraft equipped with a tone generator as part of the aircraft audio system. Refer to the appropriate aircraft wiring diagrams to determine if a tone generator is installed.

This check can be accomplished in conjunction with the Weight on Wheels and Low Speed Awareness Band Test in Section 7.22.

1. Conduct the Landing Gear Retraction, Warning Horn check as stated in the King Air Model C90 Series Maintenance Manual, listed in Table 1-2.
2. Verify that the aural tone is played through the G1000 audio system and through both cockpit speakers.

7.2.3 XM Audio Suppression Check for Aircraft with a Tone Generator

NOTE

This procedure is applicable only to aircraft equipped with a tone generator as part of the aircraft audio system. Refer to the appropriate aircraft wiring diagrams to determine if a tone generator is installed.

This procedure is applicable only to aircraft that have XM radio subscriptions.

1. Select the AUX – XM RADIO page on the MFD.
2. Plug a set of headphones into the pilot and co-pilot stations and verify that you can hear the XM radio playing in both channels.
3. Restart PFD1 in configuration mode.
4. Select page 4, Audio Alert Configuration, from the Systems menu by rotating the small FMS knob.
5. Select PLAY for the following audio and verify XM audio is temporarily muted while alert audio is being played.
   - **GEAR**
   - **STALL**
6. Verify XM audio is temporarily muted in both pilot and co-pilot stations while alert audio is being played.
7. Restart PFD1 in normal mode.

WARNING

The following step requires moving the stall warning vane. Use caution when handling the stall warning vane.

8. While monitoring pilot and copilot XM audio, actuate the stall warn transducer on the left wing leading edge in an up position (for those aircraft equipped with a Safeflight computer, actuate in the aft position), verify the following:
    - Stall warning tone is active.
    - Pilot and copilot XM audio is muted.
9. Release the stall warning transducer in the left wing leading edge, verify the following:
    - Stall warning tone is silenced.
10. Verify XM audio returns.

7.2.4 XM Audio Suppression Check for Aircraft Without a Tone Generator

GDL69 discrete inputs from stall warning and landing gear control systems as detailed in 005-W0022-00 "Wiring Diagram, G1000 / GFC 700 King Air C90A/C90GT" are required for aircraft not equipped with a tone generator.

NOTE

This procedure is applicable only to aircraft equipped without a tone generator as part of the aircraft audio system. Refer to the appropriate aircraft wiring diagrams to determine if a tone generator is installed.

WARNING

The following procedure requires operation of the aircraft landing gear. Observe all applicable safety precautions. Before working in any landing gear wheel well, ensure that all landing gear and gear door safety devices are installed. Exercise extreme caution while working around landing gear or in landing gear wheel wells.

Gear warning discrete

1. Reference the King Air C90 Mmaintenance Manual listed in Table 1-2 and jack aircraft to allow operation of landing gear.
2. Select the AUX – XM RADIO page on the MFD.
3. Plug a set of headphones into the pilot and co-pilot stations and verify that you can hear the XM radio playing in both channels. Adjust volume to a comfortable level.
4. Ensure both left and right throttles are at IDLE position.
5. Retract landing gear to the full up and locked position.
6. Verify the landing gear warning horn is active.
7. Verify XM audio is muted in the pilot and co-pilot stations.
8. Increase both left and right throttles forward of IDLE position (towards takeoff position).
9. Verify landing gear warning horn is silenced and XM audio remains muted.
10. On the MFD deselect mute softkey or adjust XM volume. Verify XM audio returns.
11. Extend landing gear to the full down and locked position and return both throttles to idle position.
12. Aircraft may be removed from jacks to accommodate other activities as required.

Stall warning discrete

1. Select the AUX – XM RADIO page on the MFD.
2. Plug a set of headphones into the pilot and co-pilot stations and verify that you can hear the XM radio playing in both channels.
3. Ensure STALL WARNING circuit breaker is closed.
4. While monitoring pilot and copilot XM audio, actuate the stall warn transducer on the left wing leading edge in an up position, verify the following:
    - Stall warning tone is active and annunciation is illuminated.
    - Pilot and copilot XM audio is muted.
5. Release the stall warning transducer in the left wing leading edge, verify the following:
    - Stall warning tone is silenced and annunciation extinguishes.
    - Pilot and copilot XM audio remains muted.
6. On the MFD deselect mute softkey or adjust XM volume. Verify XM audio returns.

7.3 GIA 63W Integrated Avionics Unit

Original GIA 63W(s) Reinstalled

No software or configuration loading is required if the removed GIA is re-installed in its original position (GIA1 and GIA2 in their original racks). This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the return-to-service checks in Section 8.

Original GIA 63Ws Swapped for Troubleshooting

No software loading is required if the originally installed GIA units are re-installed in opposite positions (GIA1 and GIA2 in opposite unit racks). However, configuration loading is required. See Section 3.9, and then continue to the GIA 63W Test (Section 7.3.1).

New Repaired or Exchange GIA 63W(s) Installed

If a new repaired or exchange GIA 63W is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9, and then continue to the GIA 63W Test (Section 7.3.1).

7.3.1 GIA 63W Test

GPS Signal Acquisition

Figure 7-3. AUX – GPS STATUS Page (MFD)

The GIA 63W units should normally acquire a GPS navigation solution within 5 to 10 minutes of startup, provided the aircraft is outside (or indoors with a GPS repeater). Select the GPS STATUS page on the MFD (4th page in AUX group). Two softkeys on the bottom of the display allow the user to toggle between GPS 1 and GPS 2. Verify that both receivers show 3D DIFF NAV on the MFD.

Continue to the VHF COM Interference test.

NOTE

It may be necessary to temporarily disable or move away from GPS repeaters while testing, as repeaters may adversely affect GPS receiver performance.

VHF COM Interference Test

This test must be conducted outside. Use of a GPS repeater inside a hangar may result in a failed test. This procedure assumes that the system is currently set to 25 kHz COM channel spacing. Once the signal acquisition test has been completed successfully, perform the following steps:

1. On the MFD, monitor GPS signal strength bars on the AUX – GPS STATUS page.
2. On the PFD, ensure that the CDI is set to GPS. If it is not, press the 'CDI' softkey until GPS ENR is displayed.
3. Verify that the GPS "INTEG" flag is out of view.
4. Select 121.150 MHz on the No. 1 COM transceiver.
5. Transmit for a period of 35 seconds while monitoring GPS 1 signal strength levels.
6. During the transmit period, verify that the GPS "INTEG" flag does not come into view on the PFD and verify that GPS 1 does not lose a 3-D navigation solution on the MFD.
7. Repeat steps 5 and 6 and re-transmit while monitoring GPS 2 signal levels on the MFD.
8. Repeat steps 4 through 7 for each of the following frequencies:
    - 121.175 MHz
    - 121.200 MHz
    - 131.250 MHz
    - 131.275 MHz
    - 131.300 MHz
9. Repeat steps 4 through 8 for the No. 2 COM transceiver (GIA2).
10. On the MFD, select the AUX – SYSTEM SETUP page.
11. Under the COM CONFIG field, change the COM channel spacing from 25 kHz to 8.33 kHz.
12. Go back to the AUX – GPS STATUS page.
13. Select 121.185 MHz on the No. 1 COM transceiver.
14. Transmit for a period of 35 seconds while monitoring GPS 1 signal strength levels.
15. During the transmit period, verify that the GPS "INTEG" flag does not come into view on the PFD and verify that GPS 1 does not lose a 3-D navigation solution on the MFD.
16. Repeat steps 14 and 15 and re-transmit while monitoring GPS 2 signal levels on the MFD.
17. Repeat steps 14 through 16 for each of the following frequencies:
    - 121.190 MHz
    - 130.285 MHz
    - 131.290 Mhz
18. Repeat steps 14 through 17 for the No. 2 COM transceiver (GIA2).
19. On the MFD, select the AUX – SYSTEM SETUP page and change the COM channel spacing back to 25 kHz.
20. Continue to the VOR/LOC/GS Test.

VOR/LOC/GS Test

Check the VOR, ILS, and Glideslope functions with ramp test equipment. Operate the equipment according to the test equipment manufacturer's instructions. Adjust the RF signal to a level adequate to perform the test. Select the appropriate HSI source by using the CDI softkey.

NOTE

The PFD HSI does not show a course deviation bar unless a valid VHF NAV frequency is tuned.

GFC 700 VOR/LOC/GS Test

1. Ensure FD is coupled to PFD1 as indicated by a left pointing arrow next to the AFCS mode controller XFR button.
2. Simulate a VOR signal on a radial equivalent to the aircraft heading. Tune the NAV 1 and NAV 2 receivers to the simulation frequency.
3. Set the HSI on PFD1 to VOR1 by pressing the CDI soft key until VOR1 is selected. Set the HSI on PFD2 to VOR2 by pressing the CDI soft key until VOR2 is selected. Rotate CRS1 and CRS2 knobs to set VOR1 and VOR2 course pointers to aircraft heading.
4. Verify full scale deflection of VOR1 and VOR2 CDI by varying CRS1 and CRS2 selected course at least 10° left and right. Reset course pointers to aircraft heading.
5. Engage the autopilot and press the NAV key on the AFCS mode controller. Using the CRS1 knob alter course by 10° to the right. Verify the flight director and aircraft controls respond by flying to the VOR course. Repeat to the left.
6. Couple FD to PFD2 by pressing the XFR button on the AFCS mode controller. Verify FD is coupled right as indicate by a right pointing arrow on the AFCS mode controller next to the XFR button. Repeat step 5 using CRS2 knob while coupled to PFD2.
7. Set CRS1 and CRS2 course pointers to aircraft heading.
8. Simulate a Localizer/Glideslope signal. Tune this signal on NAV 1 and NAV 2 receiver. Set the PFD1 HSI to LOC1 and PFD2 HSI to LOC2 by pressing CDI soft key until LOC1 and LOC2 is selected. Use the test equipment to center the deviation bars (localizer and glideslope) on PFD1 and PFD2.
9. Press the APR key on the AFCS mode controller. Verify that the LOC and PIT annunciations are green and ALTS and GS are white on PFD1 and PFD2. Apply right/left and up/down localizer/glideslope signals using the test equipment. Verify that the Flight Director and flight controls respond appropriately.
10. Couple FD to PFD1 by pressing the XFR button on the AFCS mode controller. Verify FD is coupled to PFD1 as indicate by a left pointing arrow on the AFCS mode controller next to the XFR button.
11. Repeat step 9 using while coupled to PFD1.
12. If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.4 GEA 71 Engine/Airframe Unit

Original GEA 71 Reinstalled

No software or configuration loading is required if the removed GEA 71 is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the return-to-service checks in Section 8.

Original GEA 71 Installed in Opposite Locations for Troubleshooting

No software loading is required if the original GEA units are installed in opposite locations (GEA #1 and GEA #2 in opposite unit racks). Continue to the GEA 71 Test (Section 7.4.1).

New Repaired or Exchange GEA 71 Installed

If a new repaired or exchange GEA 71 is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9, and then continue to the GEA 71 Test (Section 7.4.1).

7.4.1 GEA 71 Test

On the MFD (normal mode), check the indication for each of the sensor or monitor inputs with the aircraft engines off.

In general, verify all engine and system instruments show valid static normal values and markings, with no red Xs or erratic indications. Reference figure below (Baseline configuration instruments shown) for normal engine instrument markings.

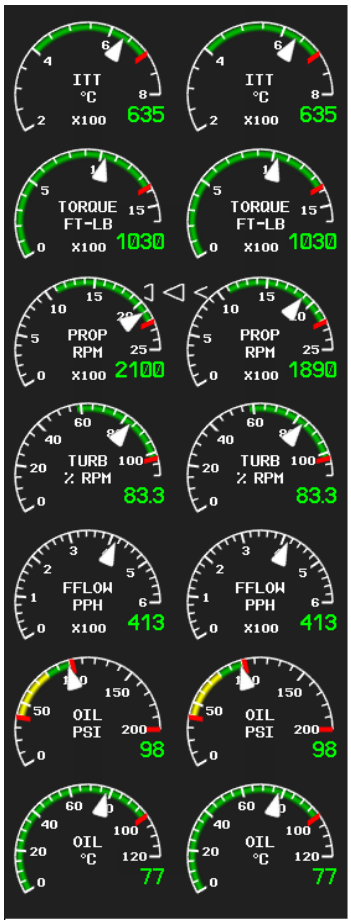


Figure 7-4. Normal Engine Instrument Markings (MFD)

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.5 GTX 33 Transponder

Original GTX 33 is Reinstalled

No software or configuration loading is required if the removed GTX 33 is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to GTX 33 Test (Section 7.5.2).

Original GTX 33 Installed in Opposite Locations for Troubleshooting

No software loading is required if the original GTX #1 and GTX #2 are installed in opposite locations. Continue to Transponder Configuration (Section 7.5.1).

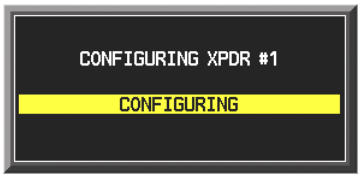
New Repaired or Exchange GTX 33 is Installed

If a new repaired or exchange GTX 33 is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9. Also enter the aircraft registration number in the GTX Config page after loading software and configuration files. Then continue to Transponder Configuration (Section 7.5.1).

7.5.1 Transponder Configuration

Select the GTX page group, and then select the Transponder Configuration page on the PFD:

1. Select the appropriate transponder.
2. Ensure that the 'ADDRESS TYPE' is 'US TAIL' under the 'SET' and 'ACTIVE' columns.
3. Activate the cursor and highlight the 'ADDRESS' field. Use the small/large FMS knobs to enter the aircraft registration number.
4. Once the correct registration number is entered, press the ENTER key. The transponder is configured:



5. The transponder then alerts the technician of complete configuration:

6. Press the ENTER key on the PFD and deactivate the cursor
7. Continue to the GTX 33 Test procedure.

7.5.2 GTX 33 Test

Operation of the GTX 33 Mode-S transponder is accomplished using PFD 1, PFD 2 or the MFD. Refer to G1000 in King Air C90 Cockpit Reference Guide, listed in Table 1-2, for basic operation.

The integrated transponder/altitude reporting system must be verified in accordance with Title 14 of the Code of Federal Regulations (CFR) §§ 91.411 and 91.413, **every 24 calendar months**, or any time the transponder is removed. This test requires the use of a Mode S ramp generator. Specific instructions for operating the ramp tester are contained in the applicable operator's manual. Refer to Title 14 CFR Part 43 Appendix F for testing criteria.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.6 GDC 74B Air Data Computer

Original GDC 74B is Reinstalled

No software or configuration loading is required if the removed GDC 74B is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to GDC 74B Test (Section 7.6.1).

Original GDC 74B Installed in Opposite Locations for Troubleshooting

No software loading is required if the original GDC #1 and GDC #2 are installed in opposite locations. Continue to GDC 74B Test (Section 7.6.1).

New Repaired or Exchange GDC 74B is Installed

If a new repaired or exchange GDC 74B is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9, and then continue to GDC 74B Test (Section 7.6.1).

New GDC 74B Configuration Module is Installed

The correct configuration files must be loaded if the GDC 74B configuration module has been replaced. See Section 3.9, and then continue to GDC 74B Test (Section 7.6.1).

7.6.1 Air Data Test (GDC 74B and standby altimeter and airspeed indicator)

IMPORTANT!

Allow unit to warm up for 15 minutes before performing the following tests.

Verification of the altimeter and airspeed must be performed using a pitot/static ramp tester. The static port and altimeter must be verified in accordance with Title 14 of the Code of Federal Regulations (CFR) § 91.411 and Part 43 Appendix E, ***every 24 calendar months***.

1. Start the G1000 system in normal mode.
2. Connect the pitot/static tester to the aircraft left and right pitot and static ports.
3. Ensure ADC1 is selected as the air data source for PFD1 and ADC2 is the air data source for PFD2. Note that the standby altimeter and airspeed indicator are connected to the copilot side pitot and static lines.
4. Simulate the altitudes shown in Table 7-1. Wait for ADTS to report that target values have been achieved.
5. Verify that computed altitudes shown for ADC1, ADC2 and Standby Altimeter are within the tolerances specified in Table 7-1.

NOTE

The following tests are above and beyond the requirements set forth in Appendix E.

7.6.2 Airspeed Test

1. Simulate the air speeds shown in Table 7-1. Wait for ADTS to report that target values have been achieved.
2. Verify that computed air speeds shown for ADC1, ADC2 and Standby Airspeed Indicator are within the tolerances specified in Table 7-1.

Table 7-1. Airspeed and Altitude Table

Test Point	Altitude			Airspeed		
	PFD1	PFD2	STBY	PFD1	PFD2	STBY
ALT / AS	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance	Tolerance
	Actual	Actual	Actual	Actual	Actual	Actual
-1000 / 50	+/-20	+/-20	+/-20	+/-2	+/-2	+/-5
0 / N/A	+/-20	+/-20	+/-20	N/A	N/A	N/A
500 / 50	+/-20	+/-20	+/-20	+/-2	+/-2	+/-5
1000 / 50	+/-20	+/-20	+/-20	+/-2	+/-2	+/-5
1500 / 50	+/-25	+/-25	+/-25	+/-2	+/-2	+/-5
2000 / 50	+/-30	+/-30	+/-30	+/-2	+/-2	+/-5
3000 / 80	+/-30	+/-30	+/-30	+/-2	+/-2	+/-5
4000 / 80	+/-35	+/-35	+/-35	+/-2	+/-2	+/-5
6000 / 80	+/-40	+/-40	+/-40	+/-2	+/-2	+/-5
8000 / 80	+/-60	+/-60	+/-60	+/-2	+/-2	+/-5
10000 / 120	+/-80	+/-80	+/-80	+/-2	+/-2	+/-5
12000 / 120	+/-90	+/-90	+/-90	+/-2	+/-2	+/-5
14000 / 150	+/-100	+/-100	+/-100	+/-2	+/-2	+/-5
16000 / 180	+/-110	+/-110	+/-110	+/-2	+/-2	+/-5
18000 / 210	+/-120	+/-120	+/-120	+/-2	+/-2	+/-5
20000 / 210	+/-130	+/-130	+/-130	+/-2	+/-2	+/-5
22000 / 100	+/-140	+/-140	+/-140	+/-2	+/-2	+/-5
25000 / 100	+/-155	+/-155	+/-155	+/-2	+/-2	+/-5
30000 / 100	+/-180	+/-180	+/-180	+/-2	+/-2	+/-5

7.6.3 Static Port Vertical Speed (Rate of Climb) Test

1. Command ADTS to change the altitude at the rates shown in the table below.
2. Wait for ADTS to report that target rates have been achieved.
3. Verify that the Rate of Climb reported by the Vertical Speed field on PFD1 and PFD2 are within the tolerances specified in Table 7-2:

Table 7-2. Vertical Speed Table

Vertical Speed, feet/minute	Allowed tolerance, ±feet/minute
6000	100
2000	100
1000	50
500	45
200	45
0	N/A (No VS Display)
-200	45
-500	45
-1000	50
-2000	100
-6000	100

7.6.4 OAT Probe Check

Ensure on-side sensors for PFD1 and PFD2. Ensure the outside air temperature (OAT) probes and a calibrated thermometer stabilize at ambient temperature. Verify that the OAT measurement shown on PFD1 and PFD2, in degrees Celsius, indicate within 2 °C of the ambient temperature as measured by the calibrated thermometer.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.7 GRS 77 AHRS / GMU 44 Magnetometer

Original GRS 77 is Reinstalled

If the original GRS 77 was reinstalled, then no software loading is required. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process.

If the GRS rack was not removed or loosened, continue to the GRS/GMU Test (Section 7.7.6).

If the GRS rack was removed or loosened, continue to the GRS/GMU Calibration Procedures (Section 7.7.1).

Original GRS 77 Installed in Opposite Locations for Troubleshooting

If the original GRS #1 and GRS #2 are installed in opposite locations (GRS #1 and GRS #2 in opposite unit racks), no software loading is required.

If the GRS rack(s) was not removed or loosened, continue to the GRS/GMU Test (Section 7.7.6).

If the GRS rack(s) was removed or loosened, continue to the GRS/GMU Calibration Procedures (Section 7.7.1).

New Repaired or Exchange GRS 77 is Installed

If the repaired or exchange GRS 77 was replaced with a new unit then software must be loaded and the unit must be calibrated. Continue to Section 3.9 for software loading. Then, proceed as follows:

If the GRS rack(s) was not removed or loosened, continue to the GRS/GMU Test (Section 7.7.6).

If the GRS rack(s) was removed or loosened, continue to the GRS/GMU Calibration Procedures (Section 7.7.1).

New GRS 77 Configuration Module is Installed

If the GRS 77 configuration module was replaced, no software loading is required. Continue to the GRS/GMU Calibration Procedures (Section 7.7.1).

Original GMU 44 is Reinstalled

If the original GMU 44 was reinstalled, then no software loading is required. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the GRS/GMU Test (Section 7.7.6).

Original GMU 44 Installed in Opposite Locations for Troubleshooting

If the original GMU #1 and GMU #2 are installed in opposite locations (GMU #1 and GMU #2 in opposite unit racks), no software loading is required. However, performing the Magnetometer Calibration Procedure is required. Continue to the GRS/GMU Test (Section 7.7.6).

New Repaired or Exchange GMU 44 is Installed

If the repaired or exchange GMU 44 was replaced with a new unit then software must be loaded. Continue to Section 3.9 for software loading. Then continue to the GRS/GMU Calibration Procedures (Section 7.7.1).

7.7.1 GRS/GMU Calibration Procedures

GRS/GMU Recalibration Criteria

There following calibration procedures are provided for the GRS 77 and GMU 44:

- Pitch/Roll Offset: (Procedure A1, PROVIDED IN SECTION 7.7.2)
- Magnetometer Calibration: (Procedure B, PROVIDED IN SECTION 7.7.4)
- Engine Run-Up Vibration Test: (Procedure D, PROVIDED IN SECTION 7.7.5)
- Magnetometer Interference Test: (Procedure E, PROVIDED IN SECTION 5.14.4)

When ready to perform the procedures, shut the PFDs and MFD off by pulling the PFD and MFD circuit breakers. Restart all displays in configuration mode. Follow the steps given for each procedure on-screen at the GRS/GMU CALIBRATION page. Note that the CALIBRATE command cannot be selected and activated until the installer acknowledges all required steps have been carried out by pressing the ENT key on each step.

Table 7-3. Required GRS/GMU Calibrations

Condition	Calibrations Required		
	Procedure A1: GRS 77 Pitch/Roll Offset	**Procedure B: GRS/GMU Magnetic Calibration**	**Procedure D: Engine Run-up Vibration Test**
Either GMU 44 was removed and reinstalled. (no change in serial number)	None Required. Continue to GRS/GMU Test section.		
GMU 44 was replaced with new unit. (New serial number)		X	
GRS 77 AHRS was removed and/or replaced. The mounting tray was NOT removed and the mounting tray bolts were NOT loosened.	None Required. Continue to GRS/GMU Test section.		
GRS 77 AHRS was removed and/or replaced. The mounting tray WAS removed and/or mounting tray bolts WERE loosened.	X	X	X
GRS 77 AHRS Configuration Module was replaced.	X	X	X

7.7.2 Procedure A1: GRS 77 Pitch/Roll Offset Calibration

This procedure must be performed for both GRS 77 units installed in the aircraft. This first procedure must be carried out with the engine off.

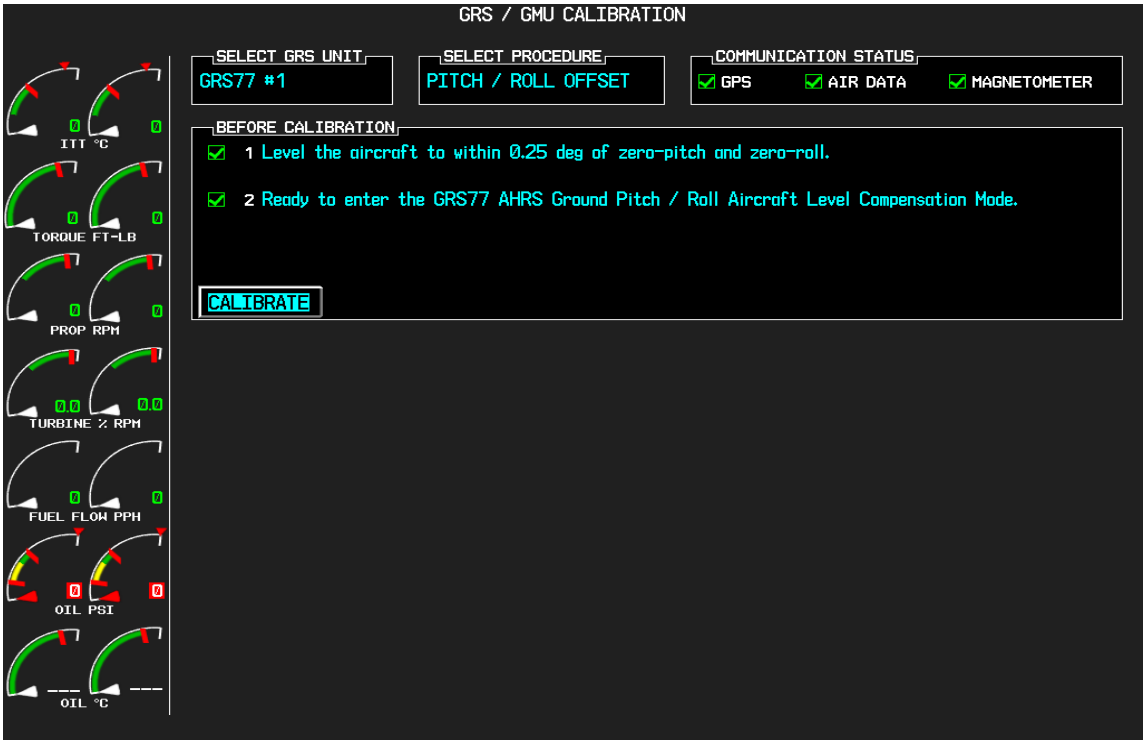


Figure 7-5. GRS 77 Pitch/Roll Offset Calibration Page

1. Level the aircraft to within ±0.25° of zero pitch and zero roll using a digital level. (Follow instructions in King Air Model 90 Series Maintenance Manual, listed in Table 1-2, for leveling)
2. Start the G1000 system in Configuration mode.
3. Go to the GRS Page Group and select the GRS/GMU Calibration page at the PFD. This page is protected and the following softkey password must be entered at the PFD to continue:
    a) 9
    b) 10
    c) 11
    d) 12 (Far Right softkey)
4. Ensure that the No. 1 GRS 77 is selected in the SELECT GRS UNIT window on the PFD.
    a) Activate the cursor and highlight the SELECT PROCEDURE window and select PITCH/ROLL OFFSET.
    b) Press the ENT key.
    c) Use the cursor to highlight the BEFORE CALIBRATION window.
    d) Follow the checklist items displayed on the PFD and press the ENT key as each step is completed or confirmed.
    e) When the CALIBRATE field is blinking, press the ENT button to begin the procedure.

f) After several seconds, a new checklist appears in the lower half of the PFD. Press the ENT key as each step is confirmed. When the CONFIRM AIRCRAFT IS LEVEL field is blinking, press the ENT key to continue.

5. The result of the pitch/roll offset compensation is displayed on the PFD. If successful, the AHRS records the required pitch and roll offsets, informs the operator of a successful conclusion and returns to normal operation.
6. Press the ENT key on the PFD to conclude this procedure for GRS 77 #1.
7. Repeat steps 1 through 6 for GRS 77 #2.

NOTE

The Magnetometer Calibration Procedure that follows in Section 7.7.4 (Calibration Procedure B) must be carried out at a site that is determined to be free of magnetic disturbances. If it is unsure whether the site is 'clean' the technician should verify that the site is 'clean' by following the guidance provided in Section 7.7.3. The technician may skip Section 7.7.3 if the site condition is acceptable.

7.7.3 Compass Rose Evaluation of Magnetic Disturbances for Magnetometer Calibration Procedure (Optional)

NOTE

Typically, a compass rose is an acceptable location to perform the magnetometer calibration procedure. However, because not all compass roses are well maintained, even an existing compass rose should be regularly evaluated using the method described here to determine if it is free of magnetic disturbances. If evaluation of an existing compass rose indicates that magnetic disturbances are present, then an alternative location must be found to perform the Magnetometer Calibration Procedure.

A G1000-equipped airplane that has completed the pitch/roll offset compensation procedure (Procedure A-1, Section 7.7.2) can be used to evaluate a candidate site for magnetic disturbances and determine whether it is a suitable location to perform the magnetometer calibration procedure. The magnetometer calibration procedure itself contains the logic to simultaneously survey the location for magnetic cleanliness while it is computing the magnetometer calibration parameters.

In order to evaluate a candidate site, the Magnetometer Calibration Procedure must be performed twice: once turning clockwise around the site, and once turning counter-clockwise. Both times, the procedure should be conducted as described in Section 7.7.4 of this document, with the exception of the direction of turns around the site.

NOTE

Although Section 7.7.4 indicates that the Magnetometer Calibration Procedure should be performed by making a series of clockwise turns around the site, the procedure can also be performed by making counter-clockwise turns for the purpose of evaluating the site for magnetic disturbances.

If, upon completion of the Magnetometer Calibration Procedure in each clockwise and counter-clockwise direction, the PFD displays the "CALIBRATION SUCCESSFUL / SITE IS CLEAN" message, then the candidate site is sufficiently free of magnetic disturbances and is acceptable for performing the Magnetometer Calibration Procedure. It is important to obtain successful result in both the clockwise and counter-clockwise directions to ensure that the magnetometer sweeps over a large enough area at the candidate site.

If, upon completion of the Magnetometer Calibration Procedure in either of the two directions, the PFD displays either the "MAG FIELD AT SITE NOT UNIFORM", or "MAG FIELD AT SITE DIFFERS FROM IGRF MODEL" message, then the site contains magnetic disturbances that are too large.

7.7.4 Procedure B: GRS 77/GMU 44 Magnetic Calibration

NOTE

Procedure A-1 (Section 7.7.2) must first be successfully accomplished before performing Procedure B, only for situations where the GRS 77 was replaced with a new unit.

Calibration Procedure B must be carried out on a compass rose in order to guarantee measurements free of environmental magnetic disturbances. Attempting to carry out this maneuver on a typical ramp area may not yield a successful calibration. The accuracy of the AHRS cannot be guaranteed if this calibration is not performed on a magnetically clean compass rose. If the compass rose condition is not known, it is recommended that the technician follow the guidance in Section 7.7.3.

1. Start the aircraft engine following the procedures referenced in the appropriate King Air AFM or AFMS as listed in Table 1-2.
2. After aircraft engine startup, taxi the aircraft to a properly calibrated compass rose.
3. At the compass rose, align the aircraft to a heading of magnetic north (±5°).

CAUTION

CALIBRATION PROCEDURE B MUST BE CARRIED OUT ON A COMPASS ROSE IN ORDER TO GUARANTEE MEASUREMENTS FREE OF ENVIRONMENTAL MAGNETIC DISTURBANCES. ATTEMPTING TO CARRY OUT THIS MANEUVER ON A TYPICAL RAMP AREA MAY NOT YIELD A SUCCESSFUL CALIBRATION. THE ACCURACY OF THE AHRS CANNOT BE GUARANTEED IF THIS CALIBRATION IS NOT PERFORMED ON A MAGNETICALLY CLEAN COMPASS ROSE OR EQUIVALENT.

NOTE

This procedure provides instructions for calibrating both GRS 77 magnetometers separately. It is acceptable to calibrate both GRS 77 magnetometers simultaneously by putting both PFD 1 and PFD 2 in configuration mode and following the procedure below, using PFD 1 to calibrate GRS #1 and PFD 2 to calibrate GRS #2.

4. Restart the PFD and MFD in configuration mode.
5. Go to the GRS Page Group on the PFD.
6. Select the GRS/GMU Calibration page and enter the following softkey password:
    a) 9
    b) 10
    c) 11
    d) 12 (far right softkey)
7. Press the FMS small knob to highlight GRS 77 #1. The FMS small knob can now be turned to select either GRS 77 #1 or GRS 77 #2 for calibration. Press the ENT key after selecting the desired GRS 77 unit to calibrate. The SELECT PROCEDURE field is not blinking.
8. Using the FMS small knob, select MAGNETOMETER. Press the ENT button.
9. Use the cursor to highlight the BEFORE CALIBRATION window.
10. Follow the checklist items displayed on the PFD and press the ENT key as each one is completed or confirmed. When the CALIBRATE field is blinking, press the ENT key to begin the procedure.

11. The PFD display advises the operator when to turn the aircraft, when to stop, and when to turn again.
12. Upon instruction to turn, taxi the aircraft in a right turn. After approximately 25° to 30° of turn from the last heading, the PFD display advises the operator to stop the aircraft.

NOTE

Due to the difficulties in executing smooth, accurate turns the PFD may incorrectly interpret a station and instruct to "HOLD POSITION" prior to full completion of a 30° turn. If this scenario is encountered, it is best for the operator to ignore the "HOLD POSITION" command and instead use outside references to complete the approximate 30° turn. Instead of using the PFD instruction to turn as a real-time indication of when to turn, simply judge the 30° (±5°) turn increments of the aircraft by using the compass rose radials. Dwelling at these 30° increments for the time recommended by the PFD should result in successful calibration.

13. The PFD guides the operator to dwell at multiple headings around a complete circle.

NOTE

Due to high winds or excessive airframe vibration, the operator may encounter a condition where the PFD restarts the 18-second countdown without full completion of the previous countdown. If this is encountered more than once for a given station, the operator should begin turning to the next station (approximately 30°). A minimum of 2 successful stations per quadrant is required, where a successful station is a full 18-second countdown followed by instruction to move. Ensure that at least 2 stations per quadrant are completed. Thus, it may sometimes be required to dwell at a station after a countdown restart. A maximum of 30 stations is allowed for the entire calibration procedure. If too many countdown restarts are encountered, the calibration will fail with the message, "TOO MANY STATIONS."

14. Repeat the turn-and-stop process until the PFD advises that a successful calibration is complete. The GRS 77 AHRS then enters its normal operational mode. Press the ENT button on the PFD to conclude this procedure.
15. Repeat steps 4 through 14 for GRS 77 #2.

7.7.5 Procedure D: Engine Run-Up Vibration Procedure

NOTE

Calibration Procedure D is performed in order to guarantee that the AHRS mounting is sufficiently rigid and insensitive to vibration. This procedure must be performed for both GRS 77 units installed in the aircraft. Calibration Procedures A1 and B (Sections 7.7.2 and 7.7.4 respectively) are not required prior to this procedure.

NOTE

Procedure is first run using with the left engine then the right.

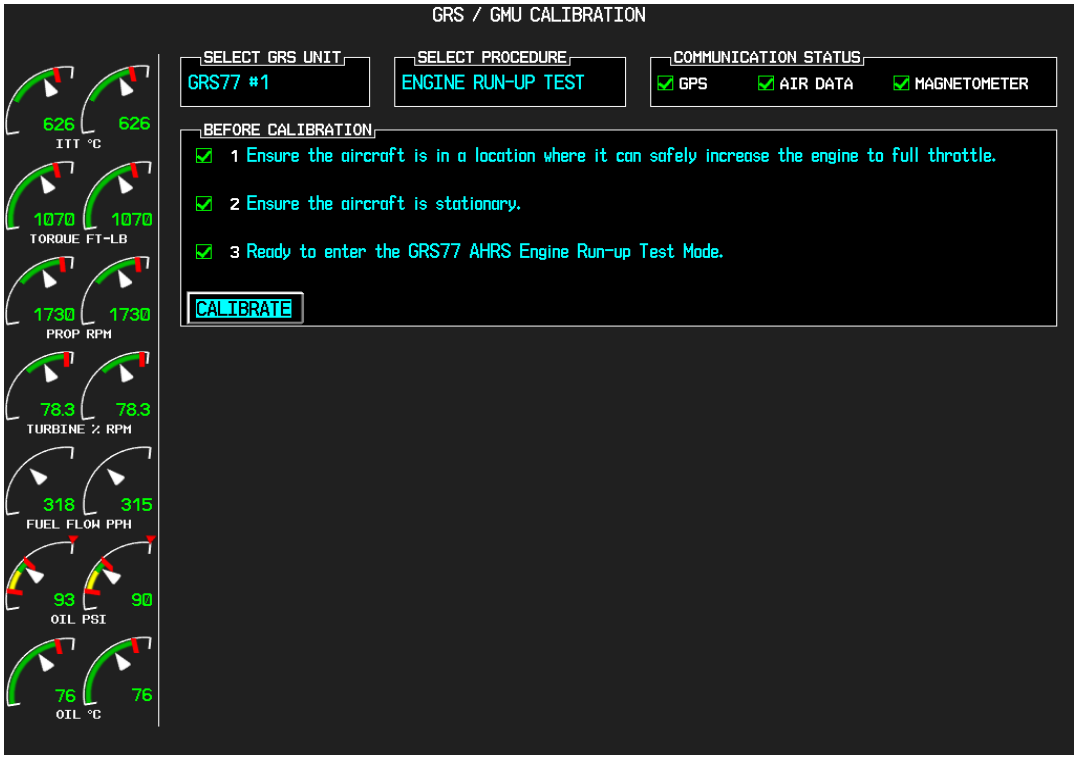


Figure 7-6, Engine Run-Up Test Page

1. Press the FMS small knob to highlight GRS 77 #1. The FMS small knob can now be turned to select either GRS 77 #1 or GRS 77 #2 for calibration. Press the ENT key after selecting the desired GRS 77 unit to calibrate. The SELECT PROCEDURE field is not blinking.
2. Initiate the AHRS engine run-up vibration test procedure by performing the following steps:
   a) Select the ENGINE RUN-UP TEST procedure and press the ENT key.
   b) Follow the checklist items displayed on the PFD, and press the ENT key as each one is completed or confirmed. When the CALIBRATE field is blinking, press the ENT key to begin the procedure.
3. The PFD display instructs the operator to gradually increase power from idle to full throttle and back to idle over a period of 2-4 minutes.

4. When the operator has completed the engine run-up and the engine is back to an idle setting, press the ENT key to indicate that the process is complete. When this is done, the TEST COMPLETE field stops blinking.
5. The PFD informs the operator if the installation has passed or failed the vibration test. If the test fails, the specific measurements causing the failure are identified and associated numeric values are displayed on the PFD.

NOTE

Should a failure occur, the technician may perform the Engine Run-up test up to 3 times successively before corrective action must be taken. If the test does not pass after three attempts, then the installation should not be considered reliable until the source of the vibration problem is identified and remedied. In the event of repeated failure of the engine run-up test, record the values that are reported to be out of range for future reference.

The following are potential causes for failure of the engine run-up test:

a) Vibration motion of GRS77 and/or GMU44 caused by neighboring equipment and/or supports.

b) Mounting screws and other hardware for GRS77 and/or GMU44 not firmly attached.

c) GRS77 connector not firmly attached to unit.

d) Cabling leading to GRS77 or GMU44 not firmly secured to supporting structure.

e) An engine / propeller that is significantly out of balance.

6. Press the ENT key on the PFD to conclude this procedure
7. Repeats steps 1 through 6 for GRS 77 #2 and proceed to Section 7.7.6.

7.7.6 GRS/GMU Test

The aircraft can now be taxied back and the engine can be shut down for final testing. Restart the displays in normal mode to conduct final system checks. When the PFDs power up in normal mode, the AHRS attitude and heading information displayed should become valid within 1 minute of power-up, as shown in Figure 7-7 (provided both GPS receivers have a valid position; if GPS is unavailable, AHRS initialization may take as long as 2 minutes).

Figure 7-7. Normal Mode AHRS Check

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.8 GDL 69A XM Data Link

Original GDL 69A is Reinstalled

No software or configuration loading is required if the removed GDL 69A is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the GDL 69A Test (Section 7.8.1).

New Repaired or Exchange GDL 69A is Installed

If a new repaired or exchange GDL 69A is installed, the correct software and configuration files must be loaded to the unit, then the XM Satellite Radio subscription must be reactivated. See Section 3.9 and the XM Activation Instructions listed in Table 1-2. Then continue to the GDL 69A Test (Section 7.8.1).

7.8.1 GDL 69A Test

If an XM Satellite Radio subscription has already been activated for the GDL 69A, then power up the G1000 and go to the AUX – XM INFORMATION page and verify that the GDL 69A is working properly. Refer to the Cockpit Reference Guide, listed in Table 1-2, for details on XM Radio weather and music operation.

If the GDL 69A is replaced (new unit), the owner must re-activate the subscription, using the new GDL 69A's Radio ID number(s). Refer to the GDL 69A/69AA XM Satellite Radio Activation Instructions, listed in Table 1-2, for details on the activation process.

As a final operations check, make sure there are no MANIFEST errors shown on the PDF for the GDL 69A.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.9 GSA 80/81 Servos

Original Servo(s) Reinstalled

No software loading is required if the removed servo(s) is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the return-to-service checks in Section 8.

New Repaired or Exchange Servo(s) Installed

If a new repaired or exchange servo is installed, the correct software files and certification gains must be loaded to the unit. See Section 3.9 and then continue to the return-to-service checks in Section 8.

NOTE

Refer to the appropriate servo installation drawing listed in Table 1-2.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.10 GCU 475 FMS Controller

Original GCU 475 Reinstalled

No software or configuration loading is required if the removed GCU 475 is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the GCU 475 Test (Section 7.10.1).

New Repaired or Exchange GCU 475 Installed

If a new repaired or exchange GCU 475 is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9 and then continue to the GCU 475 Test (Section 7.10.1).

7.10.1 GCU 475 Test

Perform the following key and knob presses and knob rotations on the GCU 475, and verify the actions on the MFD.

1. Rotate the large FMS knob and verify that the page groups change.
2. Rotate the small FMS knob and verify that the pages change within the page groups.
3. Use the large FMS knob to display the MAP page group and the small FMS knob to display the NAVIGATION MAP page.
4. Rotate the RANGE knob to the right and verify the map display zooms out.
5. Rotate the RANGE knob to the left and verify the map display zooms in.
6. Press the RANGE knob to get the pointer on the map display.
7. Move the RANGE knob to the left and verify the pointer moves to the left.
8. Move the pointer up, right and down and verify that the pointer moves accordingly.
9. Press the RANGE knob to stop displaying the pointer.
10. Press the left and right arrowheads of the SOFTKEY SELECT keys. Verify softkeys highlighting on the MFD changes.
11. Press the SEL key to select one of the softkeys.
12. Press the D→ key to display the DIRECT TO page.
13. Use the keypad to type KIXD and verify KIXD is displayed on the MFD.
14. Press the SPC key to add a space and then the BACK key to delete the space.
15. Press the CLR key to clear the field.
16. Type K34 and then press the ENTER key twice. Verify that the flight path to K34 is displayed on the map.
17. Press the FPL key to open the ACTIVE FLIGHT PLAN page. Press the FPL key again to close it.
18. Press the PROC key to open the PROCEDURES page. Press the PROC key again to close it.
19. Press the MENU key to open the MENU page. Press the MENU key again to close it.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.11 GMC 710 AFCS Controller

Original GMC 710 Reinstalled

No software or configuration loading is required if the removed GMC 710 is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the GMC 710 Test (Section 7.11.1).

New Repaired or Exchange GMC 710 Installed

If a new repaired or exchange GMC 710 is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9 and then continue to the GMC 710 Test (Section 7.11.1).

7.11.1 GMC 710 Test

Perform a basic operational check on the GMC 710. The following knob, wheel and key presses and rotations are to be performed on the GMC 710.

1. Ensure the G1000 is operating in normal mode and the autopilot is operational.
2. Press the FD key a few times; verify the Flight Director display on PFD1 toggles on and off. Leave the flight director displayed.
3. Press the XFR key and verify the white-illuminated arrowhead points in the opposite direction. Verify the green arrow displayed at the top of PFD 1 also points in the same direction.
4. Rotate the ALT SEL knob and verify the altitude bug, displayed on PFD 1 altitude tape, moves.
5. Rotate the UP/DN wheel and verify the flight director moves in the vertical direction.
6. Press the HDG key and verify the white illumination appears next to the key. Rotate the HDG knob and verify the heading bug, displayed on PFD 1 compass card, moves and the flight director follows.
7. Press the HDG knob and verify the heading bug centers.
8. Press the YD key and verify the white illumination appears next to the key.
9. Press the VS key and verify the white illumination appears next to the key.
10. Press the FLC key and verify the white illumination appears next to the key.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.12 GWX 68 Weather Radar

Original GWX 68 Reinstalled

No software or configuration loading is required if the removed GWX 68 is re-installed. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process. Continue to the GWX 68 Test (Section 7.12.1).

New Repaired or Exchange GWX 68 Installed

If a new repaired or exchange GWX 68 is installed, the correct software and configuration files must be loaded to the unit. See Section 3.9 and then continue to the GWX 68 Test (Section 7.12.1).

7.12.1 GWX 68 Test

Operation of the GWX 68 Weather Radar is accomplished using the MFD/GCU 475. Refer to G1000/C90A/C90GT King Air Cockpit Reference Guide, listed in Table 1-2, for basic operation.

NOTE

Before energizing the equipment, be sure microwave radiation safety precautions including both fuel and personnel safety considerations have been observed. These include clearing all personnel to an area beyond the maximum permissible exposure level (MPEL) boundary. The MPEL for the GWX 68 is 11 feet.

The following softkey presses are to be performed on the MFD. All other key actions are to be performed on the GCU 475.

1. Turn the large FMS knob to select the Map Page Group on the MFD, and then turn the small FMS knob to select the Weather Radar page.
2. Select the MODE Softkey.
3. Select the STANDBY to initiate the one minute warm-up period. Verify the radar enters the standby mode after the warm-up is complete.
4. Press the FMS knob to activate the cursor in the TILT field then turn the small FMS knob to select the desired antenna tilt angle. Press the ENT key. Press the FMS knob to remove the cursor.
5. Select the WEATHER softkey. After reading the CAUTION, press YES to continue. Select vertical profile mode.
6. Select the TILT softkey to activate the cursor in the TILT field and display the Tilt Line. (If the Tilt Line is not displayed on the MFD, press the MENU key and turn the large FMS knob to select ‘Show Tilt Line’). Press the ENT key.
7. Turn the small FMS Knob to adjust the antenna tilt angle then select the GAIN Softkey to activate the cursor in the ‘GAIN’ field.
8. Turn the small FMS Knob to adjust the gain for the desirable level. Verify the gain setting is visible in the gain field as a movable horizontal bar in a flashing box and the line pointer is a reference depicting the calibrated position. Press the FMS Knob to remove the cursor.
9. Select the GAIN Softkey again to recalibrate the gain. Verify ‘CALIBRATED’ is displayed in the ‘GAIN’ field.
10. Select the STAB ON Softkey to activate antenna stabilization or select the STAB OFF softkey to deactivate. Verify the current stabilization condition is shown in the upper right of the weather radar display.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.13 Traffic System Functional Check

1. Select the TRAFFIC MAP page on the MFD.
2. Verify that the STANDBY, OPERATE, TEST and ALT MODE soft keys are available on the bottom of the MFD. Verify that an operating mode; STANDBY, OPERATE, or TEST (not TAS FAIL) is displayed in the upper left corner of the traffic map. Verify that NO DATA is not displayed in yellow in the center of the display over the aircraft symbol.

NOTE

If the **ALT MODE** softkey is not displayed, the G1000 has not been properly configured for the traffic system. Reference Section 3.9.4.4, "Traffic System Option" to enable the traffic system.

3. Press the OPERATE soft key and verify that OPERATING is displayed in the upper left corner of the traffic map.
4. Press the STANDBY soft key and verify that STANDBY is displayed in the upper left corner of the traffic map.
5. Press the TEST soft key and verify that TEST is displayed in the upper left corner of the traffic map and a traffic test pattern is displayed. Upon completion of the test, verify that "TAS SYSTEM TEST OK" is heard over the cockpit speaker.

NOTE

This annunciated traffic system test message may be different from the traffic system installed on subject aircraft.

6. Open the TRFC circuit breaker on the avionics circuit breaker panel. On the MFD, verify that NO DATA is displayed in yellow after several seconds.
7. Close the TRFC circuit breaker on the avionics circuit breaker panel and verify that NO DATA is removed after several seconds.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.14 Stormscope Functional Check

Reference Section 3.9.4.5, Stormscope (WX-500) Configuration, for configuring Stormscope.
This procedure assumes familiarity with the set-up and operation of the WX-PA portable analyzer kit.

1. Apply power to the WX-500 and verify that no failed test messages appear. If fault messages do appear, refer to the WX-500 Installation Manual for troubleshooting.
2. Following successful power up, verify the following modes:
    a. Access to both 360° and ARC weather view modes.
    b. All available ranges can be displayed.
    c. Access to the cell mode and strike mode.
    d. Strike counter is displayed in all weather modes and ranges.
3. Key COM1 and COM2 several times on different frequencies representing the lower, mid and upper portion of the VHF COM frequency band. Verify keying of COM1 or COM2 does not cause strike data to appear on the MFD.
4. Operate DME, XPDR 1, XPDR 2 and weather radar. Verify these systems do not cause strike data to appear on the MFD.
5. Connect the WX-PA cable to the WX-PA antenna.
6. Position the WX-PA antenna on the WX-500 antenna. Ensure the connection is tight. If necessary, use tape to secure the WX-PA antenna. Ensure the "FORWARD" arrows are aligned and the WX-PA antenna suction cups are positioned forward of center along the longitudinal axis.
7. Secure the WX-PA cable to the aircraft with the attached suction cup and route the cable to the cockpit.
8. Connect the remaining cable end to the WX-PA.
9. Power up the WX-PA and verify the WX-500 is in the weather mapping mode (i.e. 3600 weather view at the 200 NM range.
10. Set the WX-500 to STRIKE mode; 100 NM range (or next highest available range).
11. Select the Continuous Out mode displayed on the WX-PA menu and press MENU/ENTER.
12. Select the bottom mount antenna configuration on the WX-PA keyboard ("A" key).
13. Select a cardinal bearing and a range of 120 NM.
14. Use the F1 and F2 keys to adjust range and F3 and F4 keys to adjust heading.

NOTE

The WX-500 will plot data at one-half the range selected on the WX-PA

15. Press MENU/ENTER to start the test.
16. Observe the MFD to ensure the proper positioning of the strikes, based on range and azimuth settings on the WX-PA. Change the cardinal bearings and verify correct test strikes. Verify the strikes are within 10 degrees of the selected azimuth and plot at 60NM (1/2 120 NM).
17. Verify after 20 seconds of operation the strike counter reads 580 +/-40.
18. After testing for all ranges and bearings indicated, press 2ND then MENU/ENTER to return to the main menu.
19. Select Circular Pattern mode on the WX-PA mode menu and press MENU/ENTER.
20. Select bottom mount antenna configuration on the WX-PA keyboard ("A" key).

NOTE

The MFD should be set at 100 NM (or next highest available range) on the 360 degree weather screen and in strike mode.

21. Use the F1 and F2 keys to select 120 NM range and press MENU/ENTER to start the test. Verify the WX-500 plots discharge points at approximately 60 NM.
22. Observe the MFD to ensure the proper positioning of the test strikes. Verify the strikes are within 10 degrees of the 30 degree azimuth increment and within 12 NM of 60 NM,
23. When complete, set WX-PA for 55 NM, set the MFD for 50 NM (or the next highest available range) and repeat test.
24. On the MFD, verify the sensor plots points just outside of 25 NM and the strikes are within 10 degrees of the 30 degree azimuth and within 5 NM of 27.5 NM.
25. Repeat above setting the MFD for 25 NM (or the next highest available range) and the WX-PA for 15 NM.
26. On the MFD, verify the positioning of test strikes are within 10 degrees of azimuth and within 2 NM of 7.5 NM.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.15 TAWS Functional Check

1. With the G1000 in Normal Mode, use the GCU FMS knob to select the MAP group and TAWS page on the MFD.
2. Verify that the title at the top of the page reads “MAP – TAWS-B”.

NOTE

If TAWS has not been enabled, the title will read “MAP – TERRAIN PROXIMITY” or “MAP – TERRAIN”. Refer to section 3.9.8 for TAWS Configuration for configuring TAWS.

3. Press the GCU MENU button and select “Test TAWS” from the pop-up menu. Verify TAWS test annunciation is displayed on the MFD and both PFDs.
4. After the TAWS test has completed, verify that “TAWS System Test Okay” is heard over the cockpit speaker.
5. Press the GCU MENU button again and select “Inhibit TAWS” from the pop-up menu and press ENT on the GCU. Verify “TAWS INHB” is displayed on PFD 1, PFD 2 and MFD.
6. Press the GCU MENU button again and select “Enable TAWS” from the prop-up menu and press ENT on the GCU. Verify the “TAWS INHB” annunciation on the PFDs and MFD has extinguished.
7. With a GPS position acquired, shield or disconnect the GPS antennas to remove the GPS signal. Verify “No GPS Position” shows on the MFD and the “TAWS N/A” and “LOI” annunciations show on the PFDs.
8. Reconnect or remove the shield from the GPS antennas, and verify the MFD “No GPS Position” and PFD “TAWS N/A” and “LOI” annunciations are removed once the GPS satellites are acquired.
9. Pull PFD1 PRI and PFD1 SEC circuit breakers. Re-power PFD1 in configuration mode, and use the PFD1 FMS knob to select the Audio Alert Configuration page.
10. Ensure cockpit speaker is selected ON. Use the PFD1 FMS knob to highlight each of the following messages then select PLAY. Verify each of the following audio messages can be played:

Caution Obstacle (2x)	Sink Rate	Warning – Terrain, Terrain
Caution Terrain (2x)	Terrain Ahead, Pull-Up (2x)	Warning – Obstacle, Obstacle
Don’t Sink	Terrain Ahead (2x)	Terrain, Terrain
Obstacle Ahead (2x)	Too Low, Terrain	
Obstacle Ahead, Pull-Up (2x)	Terrain (2x); Pull-Up (2x)	
Obstacle (x2); Pull-Up (2x)	Caution – Terrain, Terrain	
Pull-Up	Caution – Obstacle, Obstacle	

11. Pull the PFD1 PRI and PFD1 SEC circuit breakers, and re-power PFD1 in normal operating mode.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.16 FliteCharts Functional Check

Reference Section 3.9.4.8, FliteCharts Configuration, for configuring FliteCharts.

NOTE

This test is not required if ChartView is enabled.

1. On the MFD, use the GCU FMS knob to select "AUX – System Status" page then select DBASE softkey.
2. Use the small FMS knob to scroll to CHART.
3. Verify "FliteCharts" is displayed in blue text adjacent to "CHART".
4. Verify the FliteCharts database 'REGION', 'CYCLE' number, 'EFFECTIVE', 'EXPIRES', and 'DISABLES' dates of the subscription appear in blue text.
5. Deactivate the cursor and use the GCU large FMS knob to select the Navigation Map Page then press the SHW CHRT softkey.
6. Verify WPT – AIRPORT INFORMATION page is displayed and softkey selection advances to the following:
   - CHRT OPT
   - CHRT
   - INFO
   - DP
   - STAR
   - APR
   - WX
   - GO BACK
7. Press the CHRT OPT softkey and verify Terminal Chart is displayed and the softkeys advance to the following:
   - ALL
   - FIT WDTH
   - FULL SCN
   - BACK

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.17 ChartView Functional Check

ChartView must be enabled using a ChartView Enable Card, as specified in the General Arrangement Drawing listed in Table 1-2, and a current ChartView database. Reference section 3.9.7, "ChartView Configuration" for enabling procedures.

NOTE

The required ChartView databases are subscription-based and are to be procured by the aircraft owner directly from Jeppesen.

1. With the G1000 in Normal Mode, use the GCU FMS knob to select 'AUX – System Status' page and verify ChartView database cycle number is displayed in blue text and ChartView database is current.
2. From the Navigation Map page, press the SHW CHRT softkey and verify airport chart is displayed and the following softkeys are displayed:
    - CHRT OPT
    - CHRT
    - INFO
    - DP
    - STAR
    - APR
    - WX
    - NOTAM (grayed out)
    - GO BACK
3. Press CHRT OPT softkey and verify softkeys advance to the following level of softkeys:
    - ALL
    - HEADER (grayed out)
    - PLAN
    - PROFILE (grayed out)
    - MINIMUMS (grayed out)
    - FIT WDTH
    - FULL SCN
    - BACK
4. Return to the Navigation Map Page.
5. Press the GCU MENU key to display the PAGE MENU. Turn the GCU large FMS knob to scroll through the OPTIONS Menu to 'Show Chart'. Press the GCU ENT key to display the chart and verify airport diagram is being displayed.
6. Press the GCU FMS knob to activate the cursor. Turn the GCU large FMS Knob to select the Airport Identifier Box.
7. Turn the GCU small and large FMS knob to enter the airport identifier for New Century airport (KIXD) then press the GCU ENT key to complete the airport selection.
8. Select the APR softkey. Turn the GCU large FMS Knob to select the Approach Box then turn the small FMS Knob to show the approach chart selection choices.

9. Turn either GCU FMS knob to scroll through the available charts and select a chart for viewing by pressing the GCU ENT key to complete the chart selection and verify the appropriate ChartView chart is displayed.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.18 SafeTaxi Functional Check

The maximum map ranges for enhanced detail are configurable by the flight crew. When zoomed in close enough to show the airport detail, the map reveals runways with numbers, taxiways with identifying letters/numbers, and airport landmarks including ramps, buildings, control towers, and other prominent features. Resolution is greater at lower map ranges. When the aircraft location is within the screen boundary, including within SafeTaxi ranges, an airplane symbol is shown on any of the navigation map views for enhanced position awareness.

Any map page that displays the navigation view can also show the SafeTaxi airport layout, within the maximum configured range. The following is a list of pages where the SafeTaxi feature can be seen:

- Navigation Map Page
- Inset map
- Weather Datalink Page
- Airport Information Page
- Intersection Information Page
- NDB Information Page
- VOR Information Page
- User Waypoint Information Page
- Trip Planning Page
- Nearest Pages

1. Use the FMS knob on the GCU to select the AUX – System Status page and select DBASE softkey. Use the small FMS knob to scroll to CHART category and verify "FliteCharts" is displayed in blue text adjacent to "CHART".
2. Verify the FliteCharts database 'REGION', 'CYCLE' number, 'EFFECTIVE', 'EXPIRES', and 'DISABLES' dates of the subscription appear in blue text.
3. Use the FMS knob on the GCU to select MAP - Navigation Map page.
4. On the GCU, press MENU. With Map Setup highlighted, press ENT on the GCU. Rotate the small GCU FMS knob to select the Aviation group and press the ENT key on GCU.
5. Turn the GCU large FMS Knob to scroll through the Aviation Group options to 'SAFETAXI'.
6. Turn the GCU small FMS Knob to display the range of distances.
7. Turn the GCU FMS Knob to select 5000ft as the distance for maximum SafeTaxi display range, and then press the GCU ENT key to complete the selection.
8. Using the GCU range knob, select a range of 5000ft or less. Verify SafeTaxi display represents the current aircraft location and the airport layout.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.19 DME Functional Check

This check verifies that the DME-to-G1000 interface operates correctly.

NOTE

Support for a single Collins DME-42 system is provided as an option in the G1000. If the DME option is selected, the DME channel one audio level must be adjusted by the procedure contained within Collins DME-42 Transceiver Repair Manual 523-0772458-00611A, Maintenance Section 523-0772460-006118 to adjust DME channel one audio level. Recommended nominal DME audio output level is 1.32 Vpp + 0.10 Vpp for aircraft with C90A G1000 System Software Version 0636.01 and 4.46 Vpp +0.10 Vpp for aircraft with C90A G1000 System Software Version 0636.02 and subsequent approved versions. Procedure must be accomplished by an approved repair station.

1. If DME is not displayed, press the PFD softkeys on PFD1 and PFD2, then press the DME softkey. Verify the DME window is displayed next to the PFD1 and PFD2 HSI.
2. On PFD1 and PFD2, press the BACK softkey then select DME softkeys. Verify the DME TUNING screen is displayed.
3. On PFD1 and PFD2, use the large FMS knob to select the NAV1, NAV2 and HOLD modes in the DME field. Verify that the NAV1, NAV2 and HOLD modes can be selected by turning the small FMS knob.
4. Set NAV1 and NAV2 frequencies to 108.00 and 117.00 respectively.
5. On PFD1 and PFD2, select the DME NAV1 mode. Verify that the DME window display is set to the NAV1 frequency of 108.00.
6. On PFD1 and PFD2, select the DME NAV2 mode by pressing the ENT softkey. Verify that the DME window display is set to the NAV2 frequency of 117.00.
7. On PFD1 and PFD2, select the DME HOLD mode by using the FMS knob. Verify that the last selected NAV frequency of 117.00 remains the same when the NAV2 frequency is changed. Deselect DME HOLD.
8. On the NAV Test Set, set up a DME test and note the nav frequency. Tune NAV 1 to the test set frequency and set PFD1 and PFD2 DME MODE to NAV1. Set NAV 2 to a frequency other than the test set frequency.
9. Verify that the DME distance on PFD1 and PFD2 match the test set.
10. Select, or verify selected, DME and SPKR buttons on GMA1 and GMA2 audio panels to select the DME audio and select speaker to ON. Verify that the DME audio can be heard over the cockpit speakers.
11. On PFD1 and PFD2, set the DME mode to NAV2 and verify that the DME distance is dashed out.
12. Tune NAV 2 to the test set frequency. Set NAV 1 to a frequency other than the test set frequency.
13. Verify that the DME distance on PFD1 and PFD2 match the test set.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.20 ADF Functional Check

This check verifies that the ADF / G1000 interface operates correctly.

1. Press the PFD softkey on PFD1 and PFD2. Toggle the BRG1 and BRG2 softkey until the ADF bearing is shown on PFD1 and PFD2.
2. Verify that the ADF window is not invalid (no red 'X').
3. Using the ADF control head select a known valid local ADF. Verify that the ADF bearing pointer moves towards a bearing and stabilizes.
4. Select ADF and SPKR on GMA1 and GMA2. Using the ADF control head, select, ANT mode. Verify that the audio from the station tuned can be heard on the pilots and copilots headset and cockpit speaker.
5. Increment the ADF volume control from full low to full high. Verify the volume increases and decreases appropriately over pilots and copilots headset and cockpit speaker.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

7.21 Aircraft Weight Configuration Functional Check

The following functional check will verify that the Maximum Takeoff Weight (MTOW) and Maximum Zero Fuel Weight (MZFW) configurations were correctly loaded in Section 3.9.2, G1000 System Software Upload or Section 3.9.4, Loading Airframe Options.

Reference the operating AFM or AFMS Limitation Section for subject aircraft. Note aircraft MTOW and MZFW weight limits and determine the appropriate Weight Configuration Functional Check.

7.21.1 Aircraft Weight Limitation (MTOW = 10,100 lbs., MZFW = No Limitation.)

1. On the GCU, turn the large FMS knob to select the AUX page group. Turn the small FMS to select the AUX-Weight Planning page.

2. Select the EMPTY WT softkey. Using the GCU keypad enter a basic empty weight of 8900. Press the ENT key to confirm the entry.

3. Turn the large FMS knob to highlight the "CARGO" field. Using the GCU keypad enter a CARGO weight of 1200. Press the ENT key to confirm the entry. Verify the ZERO FUEL WEIGHT value is 10100 and displayed in cyan.

4. Turn the large FMS knob CCW to highlight the "CARGO" field. Turn the small FMS knob CW to increase the CARGO weight to 1210. Verify the ZERO FUEL WEIGHT value is 10110 and displayed in amber.

5. Turn the small FMS knob CCW to decrease the CARGO weight to 1200. Verify the ZERO FUEL WEIGHT value is 10100 and displayed in cyan.

6. Turn the large FMS knob CW to highlight the "FUEL ON BOARD" field. Turn the small FMS knob CW to increase the FUEL ON BOARD weight value to 10. Verify that AIRCRAFT WEIGHT value is 10110 and displayed in amber.

7. Turn the small FMS knob CCW to decrease the FUEL ON BOARD weight value to zero (0). Verify that AIRCRAFT WEIGHT value is 10100 and displayed in cyan.

7.21.2 Aircraft Weight Limitation (MTOW = 10,350 lbs., MZFW = 9,000 lbs.)

1. On the GCU, turn the large FMS knob to select the AUX page group. Turn the small FMS to select the AUX-Weight Planning page.

2. Select the EMPTY WT softkey. Using the GCU keypad enter a basic empty weight of 8900. Press the ENT key to confirm the entry.

3. Turn the large FMS knob to highlight the "CARGO" field. Using the GCU keypad enter a CARGO weight of 100. Press the ENT key to confirm the entry. Verify the ZERO FUEL WEIGHT value is 9000 and displayed in cyan.

4. Turn the large FMS knob CCW to highlight the "CARGO" field. Turn the small FMS knob CW to increase the CARGO weight to 110. Verify the ZERO FUEL WEIGHT value is 9010 and displayed in amber.

5. Turn the small FMS knob CCW to decrease the CARGO weight to 100. Verify the ZERO FUEL WEIGHT value is 9000 and displayed in cyan.

6. Turn the large FMS knob CW to highlight the "FUEL ON BOARD" field. Using the GCU keypad enter a FUEL ON BOARD weight of 1350. Press the ENT key to confirm the entry. Verify that AIRCRAFT WEIGHT value is 10350 and displayed in cyan.

7. Turn the large FMS knob CCW to highlight the "FUEL ON BOARD" field. Turn the small FMS knob CW to increase the FUEL ON BOARD weight to 1360. Verify that AIRCRAFT WEIGHT value is 10360 and displayed in amber.

8. Turn the small FMS knob CCW to decrease the FUEL ON BOARD weight to 1350. Verify that AIRCRAFT WEIGHT value is 10350 and displayed in cyan.

7.21.3 Aircraft Weight Limitation (MTOW = 10,100 lbs., MZFW = 9,000 lbs.)

1. On the GCU, turn the large FMS knob to select the AUX page group. Turn the small FMS to select the AUX-Weight Planning page.

2. Select the EMPTY WT softkey. Using the GCU keypad enter a basic empty weight of 8900. Press the ENT key to confirm the entry.

3. Turn the large FMS knob to highlight the "CARGO" field. Using the GCU keypad enter a CARGO weight of 100. Press the ENT key to confirm the entry. Verify the ZERO FUEL WEIGHT value is 9000 and displayed in cyan.

4. Turn the large FMS knob CCW to highlight the "CARGO" field. Turn the small FMS knob CW to increase the CARGO weight to 110. Verify the ZERO FUEL WEIGHT value is 9010 and displayed in amber.

5. Turn the small FMS knob CCW to decrease the CARGO weight to 100. Verify the ZERO FUEL WEIGHT value is 9000 and displayed in cyan.

6. Turn the large FMS knob CW to highlight the "FUEL ON BOARD" field. Using the GCU keypad enter a FUEL ON BOARD weight of 1100. Press the ENT key to confirm the entry. Verify that AIRCRAFT WEIGHT value is 10100 and displayed in cyan.

7. Turn the large FMS knob CCW to highlight the "FUEL ON BOARD" field. Turn the small FMS knob CW to increase the FUEL ON BOARD weight to 1110. Verify that AIRCRAFT WEIGHT value is 10110 and displayed in amber.

8. Turn the small FMS knob CCW to decrease the FUEL ON BOARD weight to 1100. Verify that AIRCRAFT WEIGHT value is 10100 and displayed in cyan.

7.21.4 Aircraft Weight Limitation (MTOW = 9,650 lbs., MZFW =No Limitation)

1. On the GCU, turn the large FMS knob to select the AUX page group. Turn the small FMS to select the AUX-Weight Planning page.

2. Select the EMPTY WT softkey. Using the GCU keypad enter a basic empty weight of 8900. Press the ENT key to confirm the entry.

3. Turn the large FMS knob to highlight the "CARGO" field. Using the GCU keypad enter a CARGO weight of 750. Press the ENT key to confirm the entry. Verify the ZERO FUEL WEIGHT value is 9650 and displayed in cyan.

4. Turn the large FMS knob CCW to highlight the "CARGO" field. Turn the small FMS knob CW to increase the CARGO weight to 760. Verify the ZERO FUEL WEIGHT value is 9660 and displayed in amber.

5. Turn the small FMS knob CCW to decrease the CARGO weight to 750. Verify the ZERO FUEL WEIGHT value is 9650 and displayed in cyan.

6. Turn the large FMS knob CW to highlight the "FUEL ON BOARD" field. Turn the small FMS knob CW to increase the FUEL ON BOARD weight to 10. Verify that AIRCRAFT WEIGHT value is 9650 and displayed in amber.

7. Turn the small FMS knob CCW to decrease the FUEL ON BOARD weight value to zero (0). Verify that AIRCRAFT WEIGHT value is 9650 and displayed in cyan.

7.21.5 Aircraft Weight Limitation (MTOW = 10,500 lbs., MZFW =9,000 lbs.)

1. On the GCU, turn the large FMS knob to select the AUX page group. Turn the small FMS to select the AUX-Weight Planning page.

2. Select the EMPTY WT softkey. Using the GCU keypad enter a basic empty weight of 8900. Press the ENT key to confirm the entry.

3. Turn the large FMS knob CW to highlight the "CARGO" field. Using the GCU keypad enter a CARGO weight of 100. Press the ENT key to confirm the entry. Verify the ZERO FUEL WEIGHT value is 9000 and displayed in cyan.

4. Turn the large FMS knob CCW to highlight the "CARGO" field. Turn the small FMS knob CW to increase the CARGO weight to 110. Verify the ZERO FUEL WEIGHT value is 9010 and displayed in amber.

5. Turn the small FMS knob CCW to decrease the CARGO weight to 100. Verify the ZERO FUEL WEIGHT value is 9000 and displayed in cyan.

6. Turn the large FMS knob CW to highlight the "FUEL ON BOARD" field. Using the GCU keypad enter a FUEL ON BOARD weight to 1500. Press the ENT key to confirm the entry. Verify that AIRCRAFT WEIGHT value is 10500 and displayed in cyan.

7. Turn the large FMS knob CCW to decrease the FUEL ON BOARD field. Turn the small FMS knob CW to increase the FUEL ON BOARD weight to 1510. Verify that AIRCRAFT WEIGHT value is 10510 and displayed in amber.

8. Turn the small FMS knob CCW to decrease the FUEL ON BOARD weight to 1500. Verify that AIRCRAFT WEIGHT value is 10500 and displayed in cyan.

7.22 Weight on Wheels and Low Speed Awareness Band Test

This check is accomplished to verify the integrity of the wiring interface between the right landing gear safety switch assembly and the No. 1 and No. 2 GIA inputs (Discrete IN* 2A).

1. Ensure aircraft is positioned with weight on wheels.
2. Apply external power to the aircraft. Set BAT and AVIONICS MASTER switches to ON and wait for all aircraft and avionics systems to complete their initialization and begin operating normally.
3. Check that the airspeed fields are valid within 2 minutes of power up on both PFD1 and PFD2.
4. Verify the Low Speed Awareness Band is NOT displayed in the airspeed field on PFD1 and PFD2 airspeed tapes (See Figure 7-8).

NOTE

This portion of the check can be accomplished in conjunction with the Landing Gear Aural Alert and XM Audio Suppression Test in Section 7.2.2.

5. Place the airplane on jacks (Ref. Maintenance Manual Chapter 7-00-00) with the wheels clear of the ground.
6. Verify the Low Speed Awareness Band (red band) at the low end of the airspeed tape on PFD1 and PFD2 (See Figure 7-8).
7. Remove airplane from jacks.

If no other service is to be performed, continue to the return-to-service checks in Section 8.

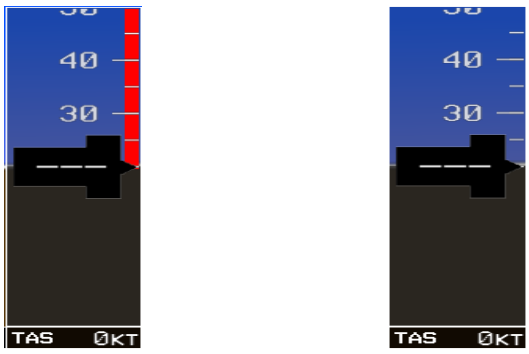


Figure 7-8. Low Speed Awareness Band Symbolization

8 System Return to Service Procedure

After reinstalling any G1000 LRU, verify the correct LRU software part numbers and versions against the numbers listed on the General Arrangement drawing, listed in Table 1-2.

1. Start the G1000 system in configuration mode.

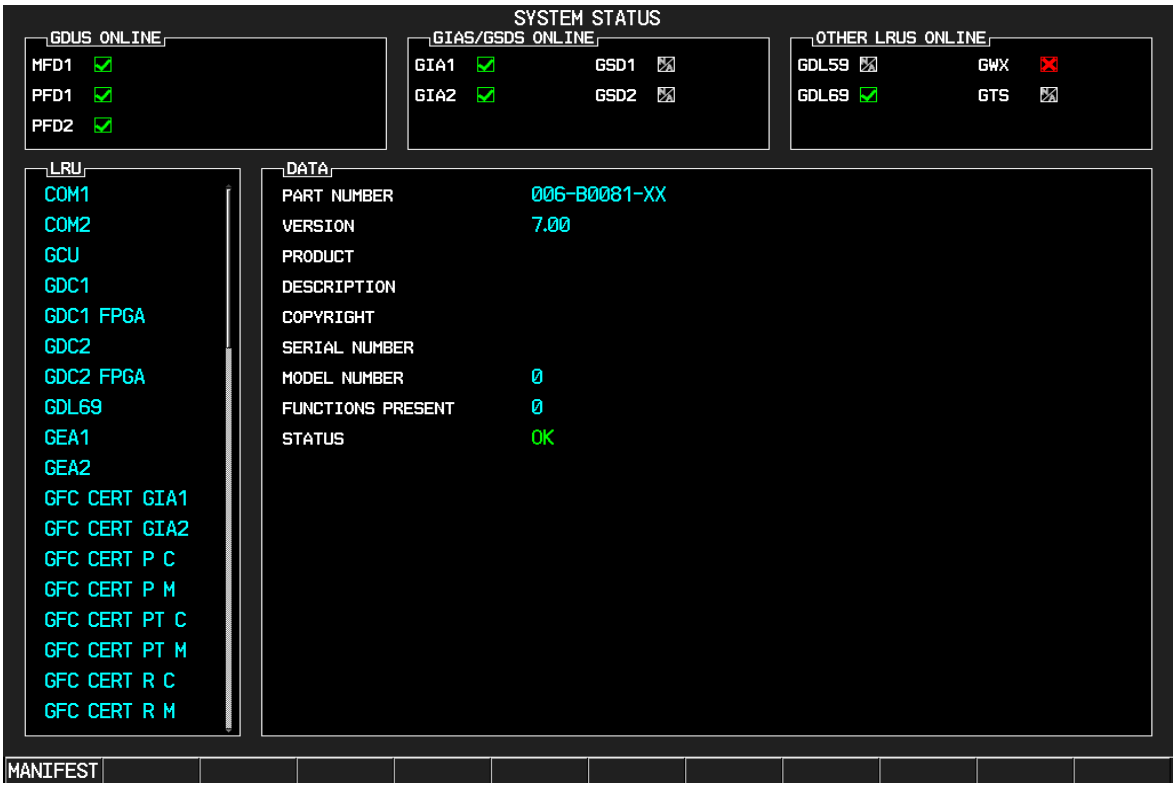


Figure 8-1. System Status Page (Configuration Mode)

2. The PFD System Status page shows a list of LRUs in the LRU window. Activate the cursor and highlight the LRU window. Use the FMS knob to scroll through the list in the window and select from the following LRUs.

Control & Display

SYSTEM SW VER OK		**SYSTEM SW VER OK**		**SYSTEM SW VER OK**	
PFD 1	_____	PFD 2 FPGA	_____	GCU	_____
PFD 1 FPGA	_____	MFD1	_____	GMC	_____
PFD 2	_____	MFD1 FPGA	_____		

CNS:

SYSTEM SW VER OK		**SYSTEM SW VER OK**		**SYSTEM SW VER OK**	
GIA1	_____	GPS2	_____	GDL69	_____
GIA2	_____	GTX1	_____	GWX	_____
GMA1	_____	GTX2	_____	GWX FPGA	_____
GMA2	_____	GIA1 AUDIO	_____		
GPS1	_____	GIA2 AUDIO	_____		

Sensors:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GDC1	_____	GMU2	_____	GEA1	_____
GDC1 FPGA	_____	GMU2 FPGA	_____	GEA2	_____
GDC2	_____	GRS1	_____		
GDC2 FPGA	_____	GRS1 FPGA	_____		
GMU1	_____	GRS2	_____		
GMU1 FPGA	_____	GRS2 FPGA	_____		

AFCS SYSTEM:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GSA PTCH CTL	_____	GSA PTCH TRM M	_____	GSA YAW CTL	_____
GSA PTCH MON	_____	GSA ROLL CTL	_____	GSA YAW MON	_____
GSA PTCH TRM C	_____	GSA ROLL MON	_____		

AFCS CERT GAINS:

SYSTEM SW VER OK		SYSTEM SW VER OK		SYSTEM SW VER OK	
GFC CERT GIA1	_____	GFC CERT PT C	_____	GFC CERT YC	_____
GFC CERT GIA2	_____	GFC CERT PT M	_____	GFC CERT YM	_____
GFC CERT PC	_____	GFC CERT RC	_____		
GFC CERT PM	_____	GFC CERT RM	_____		

3. The software part number and version is displayed in the DATA window. Compare this to the software configuration shown in the General Arrangement Drawing, listed in Table 1-2.

IMPORTANT!

It is essential that the software versions be checked and matched against the listed versions in the General Arrangement drawing listed in Table 1-2. Software Configuration is a critical part of the G1000 operation and must be verified before returning an aircraft to service.

8.1 Backup Path System Testing

This final checkout tests various secondary communications paths in the G1000 to ensure that the paths function correctly. Additional aircraft systems checks are also performed in this section. Perform the following steps and verify the results of each test.

8.1.1 GPS Failure Test

NOTE

Depending upon aircraft status and configuration, various other messages and alerts may be present on GDUs during the failure tests.

Step	Desired Result
Single GPS Failure Conditions: 1. Ensure GPS satellites are acquired. 2. Place a shroud over the GPS antenna for GIA 1 to prevent signal reception. Verify loss of signal on MFD AUX page 4. 3. Check for desired results. 4. Remove shroud from the GIA 1 GPS antenna and allow system to re-acquire satellites. 5. Place a shroud over the GPS antenna for GIA 2 to prevent signal reception. Verify loss of signal on MFD AUX page 4. 6. Check for desired results. 7. Remove shroud from the GIA 2 GPS antenna.	GPS Failure – For each of the specified GPS failure conditions, the following shall remain valid on the PFD throughout the procedure: • Attitude and Heading from AHRS. • Airspeed, Altitude, Vertical Speed, and OAT from Air Data Computer. • GPS Course Deviation Indicator remains valid on PFD. For a GIA1 GPS Failure, an amber BOTH ON GPS2 is displayed on PFD 1 and PFD 2. For a GIA2 GPS Failure, an amber BOTH ON GPS1 is displayed on PFD 1 and PFD 2.
Dual GPS Failure Conditions: 1. Ensure GPS satellites are acquired. 2. Cover both GPS antennas. Verify loss of signal on MFD AUX page 4. 3. Check for desired results. 4. Remove shrouds from GPS antennas. 5. Allow both receivers to re-acquire satellite signals before continuing.	Dual GPS Failure - For a dual GPS failure, the following shall occur: • GPS CDI flags LOI on both PFDs. • Attitude and Heading remain valid from both AHRS on both PFDs. • Airspeed, Altitude, Vertical Speed, and OAT remain valid from both Air Data Computers on both PFDs. • No GPS Position appears on MFD Map. • TAWS N/A aural alert & annunciation given. When GPS satellites are re-acquired, verify that the INTEG OK annunciation is given on the HSI in white for a brief period of time then disappears. After ~10 seconds of stable GPS position reacquisition, verify the TAWS AVAILABLE aural alert is given. Verify that the system returns to normal navigation mode (GPS CDI restored, DR annunciation removed, & GPS data magenta).

8.1.2 GIA Failure Test

Step	Desired Result
GIA 1 Failure Conditions: 1. Ensure GPS satellites are acquired. 2. Open GIA1 primary and secondary CBs. 3. Verify desired results. 4. Close GIA1 primary and secondary CBs. Allow system to re-acquire satellites and return to normal display modes.	• NAV 1 and COMM1 tuning fields on PFD1 and PFD2 are invalid (red X). • L/R engine data remains valid • XPDR1 is Inoperative. • GMA1 Is Inoperative. • AHRS1 is using backup GPS source. • AHRS2 not receiving backup GPS Information. • An amber BOTH ON GPS2 is displayed on PFD1 and PFD2. • AHRS and ADC data remain valid on PFD1 and PFD2.
GIA 2 Failure Conditions: 1. Open GIA 2 CB. 2. Verify desired results. 3. Close GIA 2 CB. Allow system to re-acquire satellites and return to normal display modes.	• NAV2 and COMM2 tuning fields on PFD1 and PFD2 are invalid (red X). • L/R engine data remains valid. • XPDR2 is Inoperative. • GMA2 Is Inoperative. • AHRS2 is using backup GPS source. • AHRS1 not receiving backup GPS Information. • An amber BOTH ON GPS1 is displayed on PFD1 and PFD2. • AHRS and ADC data remain valid on PFD1 and PFD2.
Dual GIA Failure Conditions: 1. Open GIA1 primary and secondary CBs and GIA 2 CB. 2. Check for desired results. 3. Restore power to both GIA units.	Dual GIA Failure – For a dual GIA failure, the following shall occur: • COM1/NAV1 & COM2/NAV2 fields flag invalid. • GPS CDI flags DR on PFD • NAV1 & NAV2 CDI loses deviation bar. • XPDR field flags invalid on PFD. • Engine Instrument field flags invalid on MFD. • All AHRS & ADC fields remain valid. • Red AFCS status annunciation given. • TAWS FAIL annunciation given.* • ADF/DME windows flag invalid.*

*If equipped.

8.1.3 Display Failure Test

Step	Desired Result
MFD Display Failure Conditions: 1. Open MFD CB. 2. Verify desired results. 3. Close MFD CB.	The following shall occur when power is removed from the MFD: • MFD goes blank. • All PFD1 and 2 primary flight information is retained. • The COM 1/2 and NAV 1/2 tuning fields remain valid and can be tuned by rotating the tuning knobs on PFD1 and PFD2. • XPDR 1/2 fields remain valid and XPDRs can adjusted via PFD softkeys.

PFD2 Display Failure Conditions:
1. Open PFD 2 CB.
2. Verify desired results.
3. Close PFD 2 CB.
	The following shall occur when power is removed from PFD2:
	• PFD2 goes blank.
	• PFD1 and MFD remain in normal display formats. The following illuminate on PFD1:
	  • HDG NO COMP illuminates on PFD1
	  • ROLL NO COMP illuminates on PFD1
	  • PIT NO COMP illuminates on PFD1
	  • IAS NO COMP illuminates on PFD1
	  • ALT NO COMP illuminates on PFD1
	• GMA2 Fail – GMA2 is inoperative.
	• XPDR2 Fail – XPDR2 is Inoperative.

PFD1 Display Failure Conditions:
1. Open PFD 1 PRI and PFD1 SEC circuit breakers.
2. Verify desired results.
3. Close PFD 1 PRI and PFD1 SEC circuit breakers.
	The following shall occur when power is removed from PFD1:
	• PFD1 goes blank.
	• PFD2 and MFD remain in normal display formats. The following illuminate on PFD2:
	  • HDG NO COMP illuminates on PFD2
	  • ROLL NO COMP illuminates on PFD2
	  • PIT NO COMP illuminates on PFD2
	  • IAS NO COMP illuminates on PFD2
	  • ALT NO COMP illuminates on PFD2
	• GMA1 Fail – GMA1 is inoperative.
	• XPDR1 Fail – XPDR1 is Inoperative.

8.1.4 G1000 Cooling Fan Fail Annunciation Check

Do the following to verify the cooling fans and annunciations are functioning properly

Step	Desired Result
Cooling Fan Failure Conditions: 1. Ensure the G1000 is in normal mode and verify that there are no fan related alert messages displayed in the PFD 1 or PFD 2 Alerts Window. 2. Pull the following cooling fan circuit breakers: a) PFD/GIA FANS LEFT b) PFD/GIA FANS RIGHT c) MFD FAN	Verify that the following alert messages are displayed: • AVN FAN 1 FAIL – Avionics cooling fan #1 is inoperative • AVN FAN 2 FAIL – Avionics cooling fan #2 is inoperative • PFD 1 FAN FAIL – PFD #1 cooling fan is inoperative • PFD 2 FAN FAIL – PFD #2 cooling fan is inoperative • MFD FAN FAIL – MFD cooling fan is inoperative
Fan Failure reset and acknowledgement: 1. Reset all cooling fan circuit breakers. 2. Acknowledge alerts by pressing the ALERTS softkey on PFD1.	Verify the above alerts extinguish.

8.1.5 Standby Instrument Electrical Power Checks

This section tests the standby electrical power for the standby attitude indicator, the standby altimeter and the standby airspeed indicator. The magnetic compass is tested in each Phase inspection during the cockpit lights check, (item 33 of the operational inspections) in the King Air Model 90 Series Maintenance Manual, listed in Table 1-2.

Step	Desired Result
1. Remove or ensure external aircraft power is removed. Set main battery switch to OFF. 2. Ensure the STBY ATT and STBY ALTM circuit breakers are closed. 3. Ensure the MASTER PANEL LIGHTS rocker switch in the overhead panel is in the ON position. 4. Ensure the STBY INSTR knob is turned to full bright.	Verify the STANDBY BATTERY annunciator/switch is not illuminated

Step	Desired Result
5. Select (depress) the STANDBY BATTERY switch.	Verify the following: • STBY Attitude indicator motor is energized as indicated by the indicator motor and the absence of flag. • STBY altimeter vibrator is active as indicated by vibrator noise. • STBY attitude, STBY Altimeter, STBY Airspeed indicators are illuminated full bright. • Amber “ON” is annunciated full bright on the STANDBY BATTERY switch. • White STANDBY BATTERY legend on the standby battery switch is illuminated full bright.
6. Activate aircraft power by selecting the “on” position of the BATTERY switch. 7. Ensure that the generator busses are tied by closing the GEN TIES MAN switch.	Verify the following: • “ON” annunciation should extinguish on the STANDBY BATTERY switch. • “ARM” should be fully illuminated (green) on the STANDBY BATTERY switch. • The STBY attitude, STBY altimeter and STBY airspeed instrument lighting reverts to the aircraft settings. • The STBY attitude motor and STBY altimeter vibrator remain active. • White STANDBY BATTERY legend on the standby battery switch remains illuminated.
8. Deselect the STANDBY BATTERY switch	Verify the following: • “ARM” annunciation extinguishes on the STANDBY BATTERY switch. • STBY attitude motor and STBY altimeter vibrator remain active. • White STANDBY BATTERY legend on the standby battery switch remains illuminated.
9. Remove aircraft power by selecting the battery switch to “OFF” position.	Verify the following: • The STBY Attitude motor is deactivated (the sound of the motor may be present as the gyro spools down). • The STBY altimeter vibrator is deactivated. • The STBY attitude, STBY altimeter, STBY airspeed and magnetic compass are no longer illuminated. • White STANDBY BATTERY legend on the standby battery switch extinguishes.

8.1.6 G1000 Backup Path Test

1. Remove power from the displays by pulling the following circuit breakers:
   a. PFD1 PRI
   b. PFD1 SEC
   c. PFD2
   d. MFD
2. Reboot PFD1, PFD2 and MFD while holding the ENT key on each display (far right key on MFD) until the words INITIALIZING SYSTEM appear.
3. In configuration mode, go to the GDU Page Group on PFD1.
4. On PFD1, activate the cursor and select PFD1 in the SELECT UNIT field and press ENT.
5. Observe the GRS 77 and GDC 74 DATA indicators in the ARINC 429 window.
6. Verify both indicators are valid (GREEN √), indicating the channels are receiving data as shown below:

NOTE

Reference Table 3-1 for interpretation of data indicator symbols

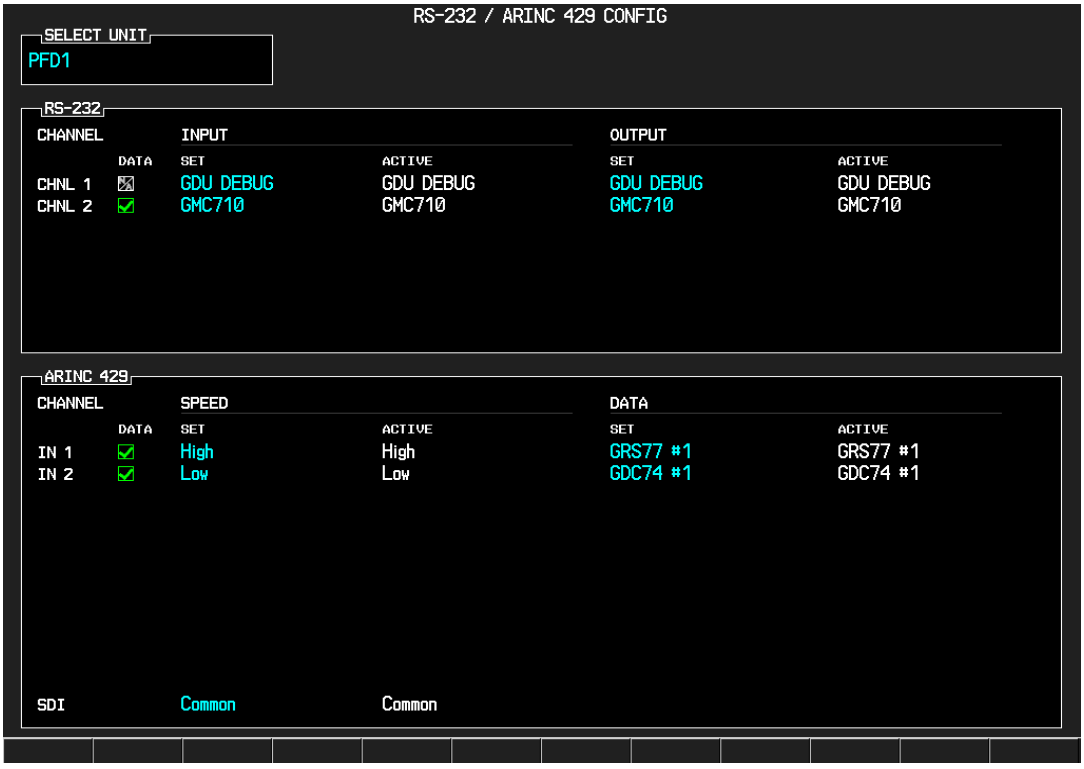


Figure 8-2. GDU Data Verification (ARINC 429)

7. On PFD1, activate the cursor and select PFD2 in the SELECT UNIT field and press the ENT key.
8. Repeat Steps 4 and 5.
9. On PFD1, activate the cursor and select MFD1 in the SELECT UNIT field and press the ENT key.
10. Repeat Steps 4 and 5.
11. On PFD1, go to the GIA Page Group. Go to the RS-232 / ARINC 429 CONFIG page.

12. Verify that GIA1 is selected in the SELECT UNIT field.
13. Observe the data indicators for all configured RS-232 and ARINC 429 channels (except GIA DEBUG), including the GRS 77 and GDC 74 ARINC 429 channels.
14. Verify all DATA indicators are valid (GREEN√), indicating the channels are receiving data as shown in the following image:

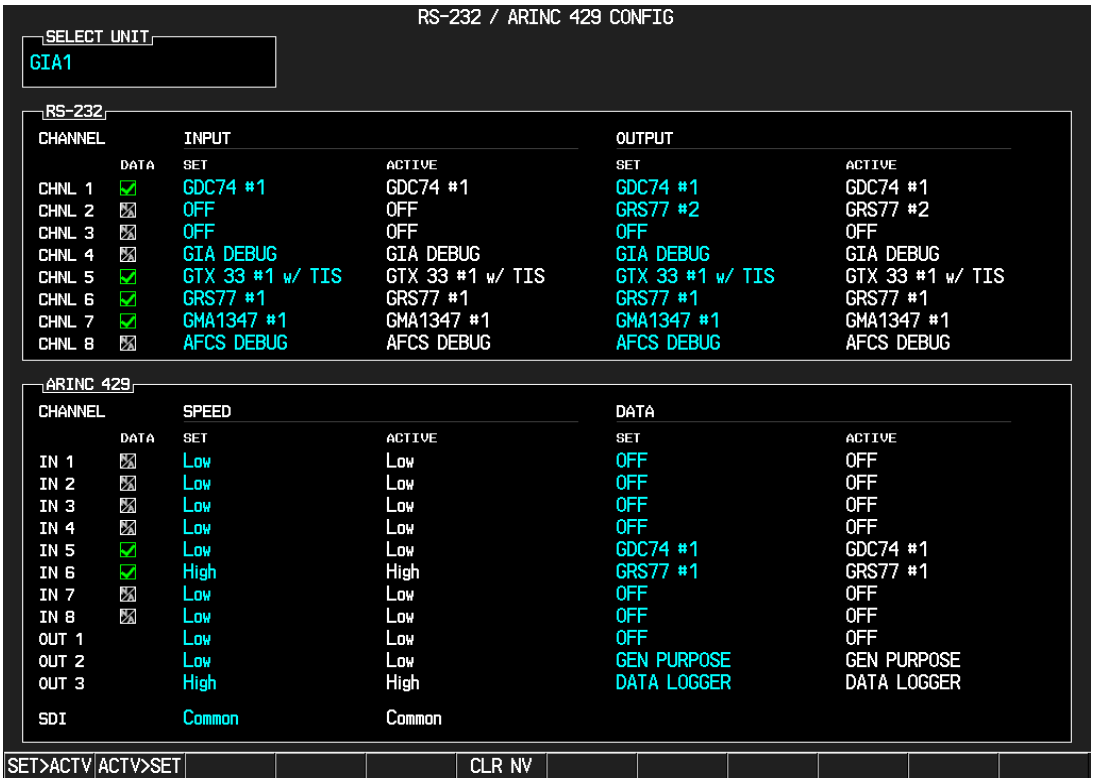

RS-232 / ARINC 429 CONFIG
SELECT UNIT
GIA1
RS-232
CHANNEL
INPUT
OUTPUT
DATA
SET
ACTIVE
SET
ACTIVE
CHNL 1 GDC74 #1 GDC74 #1 GDC74 #1 GDC74 #1
CHNL 2 OFF OFF GRS77 #2 GRS77 #2
CHNL 3 OFF OFF OFF OFF
CHNL 4 GIA DEBUG GIA DEBUG GIA DEBUG GIA DEBUG
CHNL 5 GTX 33 #1 w/ TIS GTX 33 #1 w/ TIS GTX 33 #1 w/ TIS GTX 33 #1 w/ TIS
CHNL 6 GRS77 #1 GRS77 #1 GRS77 #1 GRS77 #1
CHNL 7 GMA1347 #1 GMA1347 #1 GMA1347 #1 GMA1347 #1
CHNL 8 AFCS DEBUG AFCS DEBUG AFCS DEBUG AFCS DEBUG
ARINC 429
CHANNEL
SPEED
DATA
DATA
SET
ACTIVE
SET
ACTIVE
IN 1 Low Low OFF OFF
IN 2 Low Low OFF OFF
IN 3 Low Low OFF OFF
IN 4 Low Low OFF OFF
IN 5 Low Low GDC74 #1 GDC74 #1
IN 6 High High GRS77 #1 GRS77 #1
IN 7 Low Low OFF OFF
IN 8 Low Low OFF OFF
OUT 1 Low Low OFF OFF
OUT 2 Low Low GEN PURPOSE GEN PURPOSE
OUT 3 High High DATA LOGGER DATA LOGGER
SDI Common Common
SET>ACTV
ACTV>SET
CLR NV

Figure 8-3. GIA Data Verification (ARINC429/RS-232)

15. Activate the cursor and select GIA2 in the SELECT UNIT field, and then press the ENT key.
16. Repeat Steps 12 and 13.
17. On PFD1, go to the CAN / RS-485 CONFIGURATION page in the GIA Page Group.
18. Verify that GIA1 is selected in the SELECT UNIT field.
19. Observe the data indicators for all configured RS-485 channels.
20. Verify all DATA indicators are valid (GREEN√), indicating the channels are receiving data as shown:

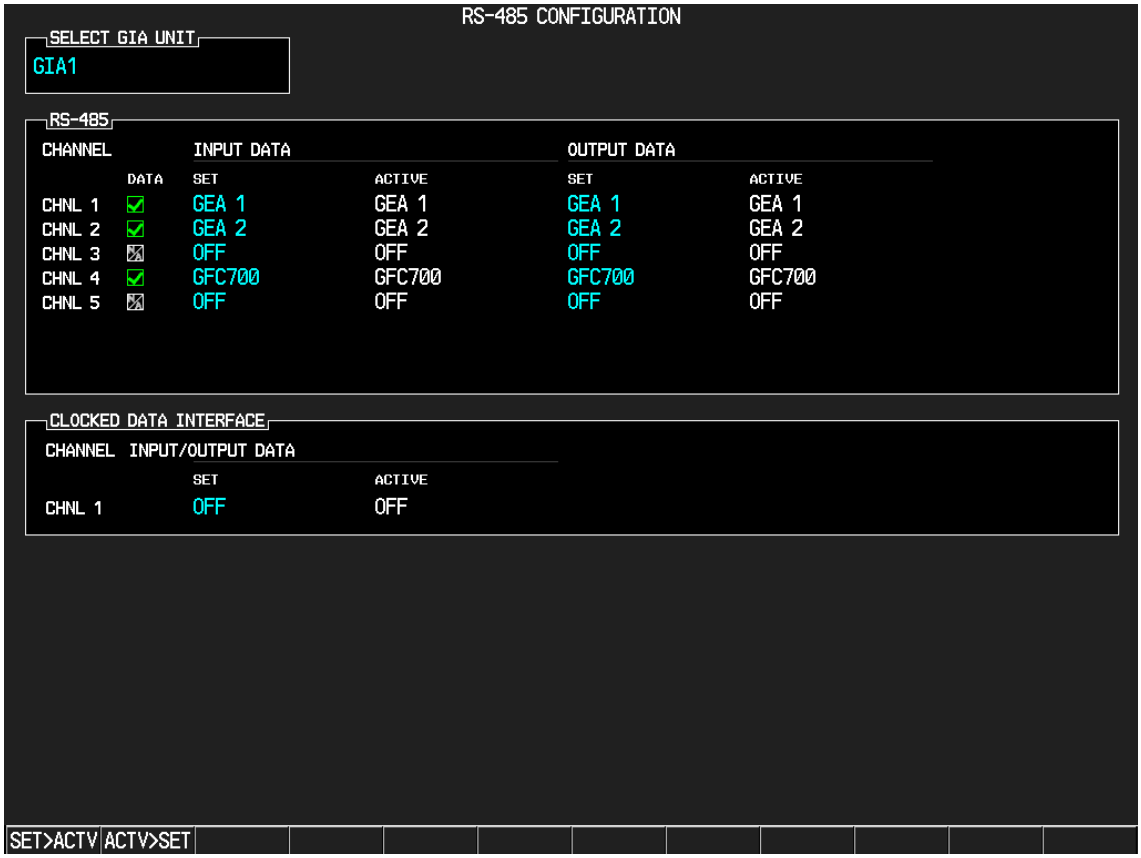


Figure 8-4. GIA Data Verification (RS-485)

21. Activate the cursor and select GIA2 in the SELECT UNIT field, and then press the ENT key.
22. Repeat Steps 18 and 19.

8.2 GFC 700 Ground Checkout

The following procedures verify the proper operation of the GFC 700 AFCS, after maintenance has been performed. The technician performing these checks should be thoroughly familiar with the G1000 and GFC 700. Information on the installation and operation of the GFC 700 can be found by referring to Sections 6.11, 6.12 and the G1000 in King Air C90 Cockpit Reference Guide, listed in Table 1-2:

NOTE

In the sections that follow, an Autopilot disconnect should be accompanied by an aural alert (two-second tone) unless otherwise specified.

8.2.1 Pre-Flight Test

1. If selected ON, select the AVIONICS MASTER switch and ground power unit to OFF. After 30 seconds select the ground power unit and AVIONICS MASTER switch to ON. Verify the GFC 700 begins an automatic pre-flight test after AHRS and ADC parameters become valid.
2. Verify that a white 'PFT' annunciation is displayed on PFD1 and PFD2, as shown in Figure 8-5

Figure 8-5. Pre-Flight Test

NOTE

A momentarily red AFCS annunciation displayed before PFT starts is acceptable.

3. Upon successful completion of the test, an aural alert will sound and the annunciation will clear. The aural alert is generated by either GIA 63W #1 or GIA 63W #2, alternately, with each system power-up. Thus, the PFT sequence must be run twice to verify both GIA units are providing the correct aural alert.

NOTE

If the 'PFT' annunciation turns red, the test has failed. Return to Section 5 for troubleshooting.

4. Repeat Steps 1 - 3 to test the PFT aural alert for the other GIA 63W.
5. Continue to Section 8.2.2.

8.2.2 AFCS Switch Checks

Verify that the AFCS system buttons and switches are operating correctly by performing the following:

1. Actuate both sections of the PITCH TRIM (NOSE UP/NOSE DN) switch to activate Manual Electric Pitch Trim (MEPT). Verify the trim clutch engages and the trim wheel drives in the requested direction. Check operation in both the up and down direction.
2. Press the AP/YD DISC TRIM INTRPT switch and hold while actuating the manual electric trim switch. Verify trim does not run and the trim wheel rotates freely when moved manually. Release the AP/YD DISC TRIM INTRPT button and PITCH TRIM switch.
3. Engage the autopilot by pressing the AP key on AFCS mode controller. Press and hold the left section of the manual electric trim switch. Verify the Autopilot disengages normally with an aural alert and the trim wheel rotates freely when moved manually.
4. Engage the autopilot again by pressing the AP key on the AFCS mode controller. Verify the pitch and roll clutches engage and resist movement of the control wheel. Press and hold the CWS switch and verify the control wheel moves freely when moved manually. Verify the green 'AP' at the top of PFD1 and PFD2 is replaced by a white 'CWS'.
5. Release the CWS switch and press the 'XFR' key on the AFCS mode controller. Verify the clutches are engaged and resist movement of the control wheel. Press and hold the CWS switch and verify the control wheel moves freely when moved manually. Verify the green 'AP' at the top of PFD1 and PFD2 is replaced by a white 'CWS'.
6. Release the CWS switch and press the AP/YD DISC TRIM INTRPT switch on the pilots control wheel. Verify the autopilot disengages with a flashing amber 'AP' annunciation on PFD1 and PFD2, accompanied by an aural alert. Verify that the control wheel is free in pitch and roll axes.
7. Engage the autopilot again by pressing the 'AP' key on the AFCS mode controller. Open AFCS SERVOS circuit breaker. Verify the autopilot disconnects and the abnormal disconnect is provided, consisting of a continuous aural alert and a flashing red/white 'AP' annunciation. Verify no AFCS annunciations (e.g. AFCS, PFT, Mistrim) remain on PFD1 or PFD2. Press the AP/YD DISC TRIM INTRPT switch to cancel the abnormal alert. Close the AFCS SERVOS circuit breaker to restore power to the system and wait for completion of the pre-flight test sequence.
8. Engage the autopilot again by pressing the 'AP' key on the AFCS mode controller. Ensure the autopilot is coupled to GIA1 by verifying the arrowhead next to the 'XFR' key on the AFCS mode controller is pointing to the pilot's side. If the arrowhead points to the copilot's side, press the 'XFR' key. Open GIA1 primary and secondary circuit breakers. Verify the autopilot disconnects with a continuous aural alert and a flashing red/white 'AP' annunciation. Press the AP/YD DISC TRIM INTRPT switch to cancel the alert and annunciation. Close the GIA1 primary and secondary circuit breakers and wait for completion of the pre-flight test sequence.
9. Press the 'XFR' key on the AFCS mode controller and engage the autopilot by pressing the 'AP' key on the AFCS Mode Controller. Press the AP/YD DISC TRIM INTRPT switch on the pilot side to disconnect the autopilot; verify the flashing amber 'AP' alert is displayed on PFD1 & 2.
10. Press the GO AROUND button on the left throttle. Verify 'TO' is annunciated on PFD1 and PFD2 for both PITCH and ROLL modes and the command bars should be at 8 degrees nose up and wings-level.
11. Press the Flight Director (FD) key on the AFCS mode controller to deactivate the GA mode. Press the AP key to engage the autopilot. Press the CWS button for a minimum of 5 seconds and release; verifying there is no residual force on the control stick for the pitch axis.
12. Disengage the autopilot by pressing the AP/YD DISC TRIM INTRPT switch on the co-pilot's control wheel. Engage VS mode by pressing the VS key on the AFCS mode controller. Verify PFD1 and PFD2 display 'VS' in green and indicates a pitch reference of '0 FPM'.

13. Press the FLC key on the AFCS mode controller and verify that 'FLC' is annunciated on PFD1 and PFD2 in green with a reference of 100 KTS.
14. Press the ALT SEL key on the AFCS mode controller and verify that the 'ALT' annunciation is displayed in green on PFD1 and PFD2 with an altitude reference equal to the aircraft altitude (within the nearest 20 feet).
15. Press the FD key and verify that the mode annunciations and command bars are removed from the display.

8.2.3 Autopilot Clutch Overpower Check

NOTE

The GFC 700 uses electronic torque limiting as well as mechanical slip clutches to limit the maximum servo effort. When the system is on the ground, the electronic torque limiting is removed, allowing manual checks of the slip-clutch settings.

1. Engage the Autopilot by pressing the AP key on the AFCS mode controller.
2. Manually overpower the autopilot clutches in pitch and roll. If the Autopilot clutches cannot be overpowered, check the servo clutch torque settings. Refer to the pitch or roll servo installation drawing (listed in Table 1-2) as applicable.
3. Actuate and hold PITCH TRIM switch in either the NOSE UP or NOSE DOWN direction to disconnect the autopilot. While the trim is running, restrain the aircraft pitch trim wheel and verify that the trim clutch can be overpowered. If it cannot be overpowered, check the trim servo clutch torque setting. Refer to the pitch trim servo installation drawing, listed in Table 1-2.
4. Engage the autopilot by pressing the AP key on the AFCS mode controller. Actuate and hold the manual electric trim switch in either the up or down direction to disconnect the autopilot. Verify that the trim wheel moves smoothly in both directions throughout the entire trim range during manual electric trim operation. If the trim wheel hesitates, this may indicate that the pitch trim clutch is slipping and proper clutch setting and cable tension should be verified. Refer to the King Air Model 90 Series Maintenance Manual and Pitch Trim Servo Install drawing, listed in Table 1-2, for clutch settings and cable tensions. If both clutch setting and cable tension are within tolerance, check the aircraft pitch trim system for excessive friction. Refer to the appropriate C90 Maintenance Manual, listed in Table 1-2.

8.2.4 Manual Electric Pitch Trim Speed Check

1. Run MANUAL ELECTRIC PITCH TRIM in one direction until it runs against the mechanical stop.
2. Run the trim in the opposite direction, and using a stop watch or equivalent device, time the trim speed to the opposite mechanical stop. Verify the elapsed time for full travel measures 15 ± 5 seconds.

8.2.5 Autopilot Operation Checks

1. Engage the Autopilot by pressing the AP key on the AFCS mode controller. Push the HDG knob to synchronize the heading bug to the current aircraft heading. Select HDG mode by pressing the HDG key on the AFCS mode controller. Verify the command bars are level and the control wheel is stationary. (There may be some roll motion in the yoke if the aircraft not perfectly level.)
2. Turn the HDG knob to the left and right and check that the command bars move in the correct direction and the control wheel follows the command bars.

3. Push and hold the CWS button and pull the control wheel to the center of the pitch control range. Release the CWS button. Verify the autopilot clutches re-engage and hold the wheel stationary.
4. Holding the control wheel lightly, rotate the NOSE UP/DN wheel on the AFCS mode controller two clicks, to increase the pitch reference. Verify the command bars move up 1 degree and the control wheel begins moving aft. (In some aircraft, the down spring may require manual assistance to get aft control stick movement).
5. While holding the control wheel firmly, press and hold the CWS button to re-synchronize the pitch reference. Re-center the control wheel to wings level and mid-range elevator travel. Release the CWS button and check that servo clutches re-engage before releasing the control wheel.
6. Rotate the NOSE UP/DN wheel on the AFCS mode controller two clicks. Verify the command bars command a pitch attitude 2 degrees lower and the control wheel begins moving forward. Hold the controls and press CWS to re-center the command bars and stop control wheel movement.
7. With the Autopilot still engaged and the CWS button pressed, move the control wheel to its aft limit. Release the CWS button and apply continuous forward pressure, slowly moving the control wheel. After a brief delay, verify the trim wheel begins moving in a trim up direction.
8. Grip the control wheel and press the CWS button. Verify trim motion stops. Move the control wheel to the forward limit and release the CWS button. Slowly move the control wheel aft. After a brief delay, verify the trim wheel begins to trim down. Relieve pressure on the wheel and verify the trim motion stops. Check that the trim wheel is free to turn. Hold the control wheel and press the AP/YD DISC TRIM INTRPT switch to disconnect the autopilot.

8.2.6 VOR/LOC/GS Test

Perform the following test using ramp test equipment. Operate the equipment according to the test equipment manufacturer's instructions.

NOTE

The PFD HSI does not show a course deviation bar unless a valid VHF NAV frequency is tuned.

1. Ensure FD is coupled to PFD1 as indicated by a left pointing arrow next to the XFR button.
2. Simulate a VOR signal on a radial equivalent to the aircraft heading. Tune the NAV 1 and NAV 2 receivers to the simulation frequency.
3. Set the HSI on PFD1 to VOR1 by pressing the CDI soft key until VOR1 is selected. Set the HSI on PFD2 to VOR2 by pressing the CDI soft key until VOR2 is selected. Rotate CRS1 and CRS2 knobs to set VOR1 and VOR2 course pointers to aircraft heading.
4. Verify full scale deflection of VOR1 and VOR2 CDI by varying the selected course at least 10° left and right. Reset course pointers to aircraft heading.
5. Engage the autopilot and press the NAV key on the AFCS mode controller. Using the CRS1 knob alter course by 10° to the right. Verify the flight director and aircraft controls respond by flying to the VOR course. Repeat to the left.
6. Couple FD to PFD2 by pressing the XFR button on the AFCS mode controller. Verify FD is coupled right as indicate by a right pointing arrow on the AFCS mode controller next to the XFR button. Repeat step 5 using CRS2 knob while coupled to PFD2.
7. Set CRS1 and CRS2 course pointers to aircraft heading.

8. Simulate a Localizer/Glideslope signal. Tune this signal on NAV 1 and NAV 2 receiver. Set the PFD1 HSI to LOC1 and PFD2 HSI to LOC2 by pressing CDI soft key until LOC1 and LOC2 is selected. Use the test equipment to center the deviation bars (localizer and glideslope) on PFD1 and PFD2.
9. Press the APR key on the AFCS mode controller. Verify that the LOC and GS annunciations are green on PFD1 and PFD2. Apply right/left and up/down localizer/glideslope signals using the test equipment. Verify that the Flight Director and flight controls respond appropriately.
10. Couple FD to PFD1 by pressing the XFR button on the AFCS mode controller. Verify FD is coupled to PFD1 as indicate by a left pointing arrow on the AFCS mode controller next to the XFR button.
11. Repeat step 10 using while coupled to PFD2.

8.3 Maintenance Records

After conducting required return-to-service procedures in accordance with the King Air Model 90 Series Maintenance Manual, listed in Table 1-2, the aircraft may be returned to service.

1. Record the following information in appropriate aircraft maintenance logs:
    a. Part number of the G1000 software loader card used to perform software loading or software updates.
    b. Record part and serial numbers of any LRU which was replaced.
    c. Record any database updates which were performed during maintenance.
    d. Any other applicable information related to the maintenance work performed on the aircraft.

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